Reforming Doctoral Education, 1990 to 2015

Recent Initiatives and Future Prospects

A Report Submitted to the Andrew W. Mellon Foundation

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This report was commissioned by the Andrew W. Mellon Foundation to provide an historical overview of initiatives to reform graduate education in the last 25 years. It is intended as a resource for administrators, faculty, students, and others interested in graduate education. The conclusions and recommendations contained within the report are those of the authors alone.

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Executive Summary

In this report, we summarize the contemporary history of efforts to improve Ph.D. education in the United States with an eye to the future. This survey of major reform efforts of the last quarter century makes evident a consensus stretching, sometimes surprisingly, across the arts and sciences. Such a consensus deserves consideration in formulating any new agenda. But in assessing why recent reforms were not more readily adopted by doctoral programs, we also hope to present lessons for more effective means to achieve the goals of that consensus.

The report is organized in three parts, by a history of recent national efforts, then by a cross-cutting of past and current reforms organized by topic, and finally by a small number of fundamental recommendations for future action.

1. The Recent History of Ph.D. Reform

A flurry of reports in the 1990s highlighted major shortcomings in PhD education in the arts and sciences. The degree took too long—about eight years in the humanities, and six plus several post-doc years in the sciences. Attrition from doctoral programs stood at about fifty percent, and socioeconomically disadvantaged groups were badly underrepresented, as were women in the sciences. Most degree programs were structured on the assumption that graduates would join research university faculties. The lengthened time to degree and singular focus on professorial careers resulted from a nostalgia for the single Cold War generation of full academic employment. Times changed, but attitudes did not change with them.

In fact, nearly half of all students in the humanities never achieved tenure-track positions at colleges or universities of any kind, and half of all science students did not even identify academic careers as their goal. This has been more or less the case for nearly two generations. In their attempts to restore a lost status quo, doctoral programs became so narrowly careerist that their attempts to be practical produced the opposite effect.

In addition to various foundation-funded efforts at student diversity (most of which remain ongoing), major reforms efforts that began during the 1990-2005 period included:

- The Graduate Education Initiative (sponsor: the Andrew W. Mellon Foundation). Sought to reduce time to degree, reduce attrition, and improve efficiency during the latter years of doctoral education.

- Preparing Future Faculty (Association of American Colleges and Universities, and the Council of Graduate Schools). Sought to expand professional development for doctoral students through an emphasis on teaching and service in a wide range of colleges and universities.

- Re-Envisioning the Ph.D. (University of Washington Graduate School). Sought to prepare students for a full range of roles and careers in various social sectors, within and beyond academia.

- The Humanities at Work (The Woodrow Wilson National Fellowship Foundation). Sought to encourage greater career opportunities within and beyond the professoriate for PhDs in the humanities.

- Intellectual Entrepreneurship Program (University of Texas). Sought to create citizen-scholars and direct their work toward community challenges.

- The Responsive Ph.D. (The Woodrow Wilson National Fellowship Foundation). Sought student diversity, interdisciplinary scholarship, professional development, diverse career options for doctoral students across the arts and sciences, and community engagement.

- The Carnegie Initiative on the Doctorate (Carnegie foundation for the Advancement of Teaching). Sought wise stewardship of the academic disciplines in the arts and sciences by engaging faculty in programmatic self-evaluations.

These reforms mainly supported efforts in a relatively small number of programs, with the hope that they would serve as models to the larger Ph.D. community of institutions. Findings were extensive, and a developing consensus on what needs changing was strikingly evident. But actual improvements in practice, while they did occur especially in programs and institutions with an authentic appetite for change, were modest and generally disappointing.

As foundations were drawn to crises in K-12 public education and as they found the results of Ph.D. reform not worth the expenditure of major funding—especially in comparison to other social challenges—national efforts diminished after 2006.

But the unease with traditional doctoral education simmered, especially as the academic job market worsened and the number of under-employed Ph.D. graduates increased. Consequently, new and continuing efforts have been mounted since 2010, including:

- The ACLS Public Fellows Program (American Council of Learned Societies). Seeks to expand the reach of doctoral education in the US by placing recent Ph.D.'s into positions at select government and nonprofit organizations.

- Career Diversity for Historians (American Historical Association). Seeks to better prepare graduate students and early-career historians for a range of career options within and beyond the academy.

- Connected Academics (Modern Language Association). Develops the capacity of doctoral students in the humanities to bring their expertise to a wide range of careers.

Initiatives in the sciences include those by the Council of Graduate Schools on degree completion, by the Center for the Integration of Teaching and Learning (CIRTL), and by the National Science Foundation in its Research Traineeship Program, which seeks to focus grants on student development rather than on faculty research alone.

2.   The Twelve Challenges

Here we distill a dozen issues that were defined by the reports of the 1990s and the reforms of the first half of the 2000s. These continue to constitute the major challenges facing doctoral education.

Admission and Attrition

Challenge: Programs seek faculty clones rather than valuing creativity and a spectrum of goals, and employ the GRE uncritically toward that end. Some programs accept too many students, aware that fully half across all disciplines will not finish the degree.

Reforms: More holistic and sophisticated measures of student achievement (27); redefinition of program goals to include a variety of student motivations and thus recruit a more diverse cohort (29); clearer expectations and start-to-finish counseling (31); more frequent and thorough student assessment and advising in the first two years (31).

Diversity

Challenge: Progress has been made but African Americans, Hispanics, and Native Americans are still severely under-represented and challenges to affirmative action have had a chilling effect. Women similarly have advanced in number but some fields remain male-dominated; and in all non-diverse situations, there is an intellectual as well as a social loss. The curriculum and culture of many programs also fail to acknowledge and encourage diversity.

Reforms: Alliances with high schools, community colleges and colleges; funding for underrepresentation by race, gender and income rather than one or the other (33); summer programs; program culture and curricular change to take note of diversity (34); emphasis on civic engagement; and collaboration among national funders (33).

Data and Assessment

Challenge: Programs lack information on student outcomes and on the validity of program practices, while at other levels of education an assessment revolution is taking place.

Reforms: National data project with agreed-upon elements and wide publication (35); transparency with potential and incoming students (34); surveys by programs of current students and recent alumni concerning program features, collection of data by programs on time to degree, attrition, and career outcomes (34).

Student Support

Challenge: Financial support varies widely and at times is afforded in ways that do not further students' development as teachers and creative thinkers.

Reforms: National Panel of University Budget Experts on funding of students and program initiatives (37); decisive move in the sciences to training grants and inclusion of training elements in research grants (36); summer support (37); healthcare benefits for graduate students (35); support funds tied to important aspects of training and conditioned upon progress to degree (37).

Professional Identity and Public Engagement

Challenge: The doctoral degree remains hermetic and programs often fail to train students to address wider audiences or to apply their learning to social challenges.

Reforms: Professional development seminars; explanations of work to general audience as dissertation requirement; poster sessions, on-line projects, and other means of communication integrated into existing courses (38); liaisons between programs and existing offices of civic engagement and community service (39).

Time to Degree

Challenge: The Ph.D. takes unreasonably long, at eight years in the humanities and six, plus postdoctoral years, in the bench sciences.

Reforms: Clear expectations announced ahead of time; reconsideration of efficacy of all practices; funding conditional on progress with faculty making timeliness reasonable; fitting requirements to a set time period; concerted advisement from start to finish (42). (The example of a Professional Master's Degree in the sciences has not yet been replicated successfully in non-science fields, but a meaningful role for such a degree is a further challenge for graduate schools going forward.)

Career Aims

Challenge: Close to half of all humanities students will not achieve tenure-track positions, and only a fraction of them at research universities, and half of all students in the sciences do not even wish for an academic career. Yet the structure of doctoral education often presupposes a faculty career rather than developing forms of expertise with versatile applications across the social sectors.

Reforms: Continuous collaborations between career offices, alumni offices, and graduate programs; intramural and extramural internships which may be substituted for teaching assistantships (44); use of campus offices such as development, student affairs, communications, and admissions for these intramural internships (44); post-doc programs aimed at alternative careers; support for summer internships (45).

Curricular Coherence and Intellectual Breadth

Challenge: Programs often operate as a faculty free-for-all in course offerings rather than serving students with a coherent curriculum; and both collaborative teams and inter- and multi-

disciplinarity are praised but rarely receive viable support, especially in the humanities and humanistic social sciences..

Reforms: Faculty discussion focused on student curricular interest (47); experiments with course structures in addition to seminars, such as on-line, tutorials, interruptible lectures (47); explicit multi-disciplinary opportunities managed by the graduate school (47).

Advising and Departmental Culture

Challenge: Doctoral advisement is fragmented, not unified. Many faculty members see it solely in relation to dissertations rather than throughout program stages. Funding in the sciences may subordinate a student's interests to the teacher's grant, while guidance in the non-sciences is often haphazard, encouraging drift.

Reforms: Clearer expectations for faculty on advising, with attention to stages and responsibilities; meetings with students on program elements; student-to-student advising (30-31).

Qualifying Exams

Challenge: Comprehensive exams remain a norm, but often form a barricade to the dissertation rather than preparing students for the teaching and research that lies before them.

Reforms: Dissertation prospectus as aspect of exam; faculty discussion of purposes of exam (49); possible substitution of portfolios or series of varied evaluated exercises, including course invention, and scholarly/research abilities (49).

Scholarship and the Dissertation

Challenge: There is little reflection on the nature and norms of the dissertation project, often resulting in intellectual conformity. Pressure to publish while in graduate school either lengthens time to degree or crowds out other aspects of training.

Reforms: Encouragement of a broader variety of dissertation projects (50). In the sciences, more training grants in place of research grants, or training as a required aspect of research grants (50).

Pedagogy

Students in the sciences are taught to consider teaching as low in status. Across the disciplines, students teach courses that faculty do not wish to teach rather than a sequence that develops their abilities as educators. Students are not exposed to the range of teaching environments other than research universities, nor are they exposed to the rapid developments occurring in understanding processes of student learning in the various disciplines.

Reforms: Pedagogy and learning theory as important aspects of the formal curriculum (53); grants to faculty to investigate developments in cognitive science and learning theory in relation to the discipline (53); graduated set of teaching experiences; collaborations of research

universities with local or regional colleges, community colleges, and branch campuses to afford students actual teaching experience in a variety of settings (52).

There are programs that are actively taking up each of these challenges. These efforts are spotlighted throughout the second section of the report.

Finally, we should note one overarching challenge that encompasses the foregoing. Ph.D. education typically lacks an administrative authority dedicated to its maintenance and improvement. Many institutions lack a graduate dean or school. At many others, the graduate dean lacks financial resources and institutional authority. When authority lies with a provost or a research vice president, each with myriad other responsibilities, a responsibility vacuum easily comes to surround doctoral education.

3. Instruments for Change

Reform of doctoral education needs a better ratio of effort to results. To translate the most promising reform efforts into national norms for an improved doctoral experience, we propose structural changes and incentives that begin with the offices of the university president and the provost, through deans and faculty members, extending to the students themselves. The linchpin for these efforts must be an empowered graduate dean leading a multi-disciplinary and sufficiently funded graduate school within the university. Almost as crucial is communication among university offices--for example, alliances between each program and offices of career development and alumni relations.

Six Essential Recommendations

1. **Promote a cultural change in the definition of the Ph.D. degree, as providing disciplinary expertise applicable to all social sectors** to augment the narrow goal of replenishing the faculty. Provide advising, training, and internships that allow for a range of academic and extra-academic career options, keeping in mind the changes in the professoriate: for example, the growing proportion of teaching-centered faculty positions at two-year colleges, branch campuses, small colleges, and (off the tenure ladder) even at research institutions. Seek program efficiencies that allow for a more versatile training without lengthening time to degree.

2. **Empower the Graduate Dean and the Graduate School** with a budget that will allow implementation of student-centered practices of programs, innovations in admissions, advising, efficient student progress, and training for diverse career options in and beyond academia. At institutions where no graduate dean position exists, create a locus of responsibility for student-centered excellence in doctoral education. Further, allocate modest funds for the Graduate School or the central administration to maintain a database for each program encompassing admissions, program practices, and student outcomes.

3. **Design a national system that rates (not ranks) programs and graduate schools on the basis of student-centered practices and make these results available online on a regularly-updated website.** The intent is to provide a counterweight to reputational surveys. Checkpoints could include, for example, reasonable attrition rates (under one third), responsible time to degree (6.5 years or under), a diverse student cohort, developmental training in pedagogy, training for expanded career opportunities, appropriate student financial and benefit support, and interdisciplinary and collaborative opportunities. The particular goals may be debated and refined, but the basic idea of a national website that tracks student-centered practices is a necessity to provide an intelligent form of evaluation. In the event that prospective students come to rely on it, it will become a source of prestige as well.

4. **Make diversity comprehensive and coherent.** Diversity is more than a matter of cohort demographics, as vital as those are. Its imperatives affect all of graduate education, including curriculum, program culture, support and the financial aspects of time to degree, along with engagement with social challenges.

5. **Coordinate efforts by organizations seeking to improve Ph.D. opportunities for students from under-represented groups** by bringing funders together in an overall diversity collaboration. Consider inclusion of groups that focus on recruiting students from under-represented groups at the undergraduate level for their ability to forward the possibility of study beyond the B.A.

6. **Direct national funding by foundations and government agencies at these same student-centered practices.** Funding proposals should include plans for permanence beyond current personnel. When selected programs are funded that implement innovation, they should include plans for disseminating the practices to other institutions, an effort which the funder can facilitate through convenings. Funders not only should require institutional cost-sharing but could also establish a preliminary review panel to determine cost effectiveness, thus allowing institutions to determine the viability of their proposals at an early date. Assessment should be continuous, with conditional funding dependent on demonstrated program improvement. National funders should communicate with each other to coordinate activities and learn from collective experience, and maintain a website to keep a record of reform efforts. Funds ideally should flow through the graduate dean to ensure that there is sufficient local oversight and to center responsibility on the quality of doctoral education.

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Introduction: Methods and Aims of the Report

In this report on doctoral education, we focus on reforms of the last 25 years, especially a period of intense rethinking of the PhD from the mid-1990s to 2006. Only recently have new national initiatives been mounted, and these are included as well.

The earlier efforts constitute something of a sunken ship full of valuable cargo. Initiatives run their courses and then are forgotten, because graduate deanships turn over frequently and presidents and provosts are often not aware of issues at the doctoral level that most affect students. Thus reform efforts and their outcomes have not gained a traction that would serve institutions—and their students—very well. This document seeks to rectify that.

In fact, the impetus for this report arose from a meeting of current deans of graduate schools. Their concerns were disconcertingly familiar. For the sake of clarity and organization, we have gathered those concerns into a dozen categories, briefly described below and later discussed in detail.

Admissions and Attrition

The criteria for admission to doctoral programs in the arts and sciences are rarely examined, despite the roiling changes in the milieu. The GRE is often employed uncritically and more meaningful forms of evidence of student potential are frequently ignored. At the same time, the attrition rate from doctoral programs stands at 50%, with half of that occurring after more than three years in the program.[1] Despite the considerable waste of student time and faculty and university resources, this is an area in which reforms have been rare.

Diversity

Though the study of disadvantaged groups thrives in the academy, their members are poorly represented within it. The number of students of color and of women earning doctorates has increased steadily over the last forty years, but slowly, so that academia remains less diverse than the national population by a power of three; and some fields remain predominantly male.

Data and Assessment

Higher education is engaged in what might be called an assessment revolution. By and large, however, doctoral programs do not assess their practices and outcomes, and they do not train students in assessment skills.

Student Support

Considering the lengthy time to degree, funding of doctoral students varies wildly from institution to institution and field to field, but it is consistently low. There are different kinds of institutional ecosystems that use their graduate students differently. For example, wealthy institutions construct a different experience for their students than universities that need them to teach to meet the needs of the bottom line. However, regardless of these prevailing differences, amounts and kinds of support are not typically considered as part of an overall strategy to accelerate student progress or to promote experiences that will lead to successful career outcomes.

Professional Identity and Public Engagement

The public disillusionment with higher education spotlights the need for Ph.D.'s who can address a wide audience and who can translate their knowledge into socially beneficial citizenship. The arts and sciences have taken on a less hermetic stance in recent years, but this is not yet reflected clearly in doctoral education, where it may be most crucial.

Time to Degree

The data permit various ways to calculate time to degree, but all agree that it is: 1) higher in the humanities and humanistic social sciences (where some calculations show it to at nine years) than in the bench sciences (where it is widely calculated at six years plus a lengthy series of post-docs); and 2) too high in both. The increase in time to degree feeds the ethical crisis in doctoral education; only recently have graduate schools begun to address it. Graduate programs (and all of higher education, for that matter) have a bad habit of adding features but never letting go of any. We need to say "at the expense of" more often than we do. Even while adding training that prepares students for a wider range of career options, programs can find efficiencies in many practices, such as substituting student support for an internship instead of for the fourth semester of teaching the same introductory course, providing support for summer experiences, and adopting other practices suggested throughout this report. (See, for instance, the discussion below on the practice of the comprehensive examination as well as such matters as clarifying requirements and keeping students on track.)

Career Aims

Graduate school prepares students for jobs at research universities that most will not get, but more important, it teaches them to desire these jobs above all others. It is difficult to defend training that prepares students only for the professoriate when nearly half of all humanities doctoral graduates never find a tenure-track position and more than half of all science doctoral students do not desire an academic career. This disjunction pervades doctoral education.

Curricular Coherence and Intellectual Breadth

After decades of canon wars and the pressure of an academic job market that demands both general and specific expertise, many humanities fields suffer from curricular instability. This is reflected by incoherent course offerings that fail to prepare students for what lies before them. While specialization increases in all disciplines, multi-disciplinary offerings and efforts are praised but underfunded.

Advising and Departmental Culture

There is little consistent advising in non-science fields aside from dissertation directing, and even that is often unstructured. In the sciences, the stranglehold of grant funding often sacrifices training to lab necessity—that is, the students' interests are subordinated to the teacher's interests.

Qualifying Exam and Alternatives

Comprehensive exams need to prepare doctoral students for the teaching and research that lies before them, and to do so with alacrity. The exams should be a stepping stone and not a barrier. Perhaps because this area is among the easiest in doctoral education to change, it is an area in which rapid reform is taking place.

Scholarship and the Dissertation

The dissertation requirement is the sine qua non of doctoral education, yet there is little reflection on what a dissertation ought to do—and therefore what it ought to consist of. As dissertations become longer and more involved, time to degree rises. Relatedly, the pressure on graduate students to publish while in graduate school continues to increase.

Pedagogical Training

Whether or not they will wind up as teachers, doctoral students need to learn how to teach. Teaching skills serve them in a variety of pursuits. Yet teacher training is inconsistent across institutions and disciplines, and often appears in the form of an option that students are not encouraged to choose.

This list suggests that graduate school, always conservative, has become inflexible. The PhD degree has not essentially been altered since its institution in the late nineteenth century, while

everything surrounding the PhD--the landscape of higher education, and the challenges and opportunities inside and outside of it--has altered mightily.

In fact, the list probably would have looked the same if it had been compiled twenty-five years ago. The issues are perennial and ubiquitous and have inspired multiple attempts at reform. For all the words and promising models, the norms of doctoral education have changed little.

There are several causes for this inertia. One is institutional and individual conservatism: the sense that "it has always been done this way," when "always" often means "since the university boom of the 1960s." Another cause is normal human self-interest, in which programs are keyed more to the interests of the faculty than the needs of the students. A third is the lack of institutionally strong leadership in the form of a graduate dean or similar figure with authority and resources to alter a stubborn structure. Intramural conflict is another factor. The growth of graduate student unions occurred during the time of many of the reform efforts described here, and conflicts and distractions between students and faculty have sometimes substituted for work together on program improvement. A final cause for inertia consists in parochialism, the lack of information and context on the part of faculty (and sometimes administrators). That cause, if ameliorated, holds the promise of alleviating others, for along with normal self-interest, educators possess a healthy degree of good will, idealism, and dedication to students.

It's not too late. This report is intended to repair the rent in the history of reform efforts and recuperate what we know now about doctoral education. More positively, it is a propitious time for such a report, as a spate of new considerations of the PhD are getting published and new reforms (particularly on careers beyond the professoriate) have been instituted, including three (by the MLA, AHA, and ACLS) funded by the Mellon Foundation. Moreover, there appears to be increased faculty and administrative acknowledgement that the doctorate requires fresh self-examination and change.

The report is organized in three parts. The first provides a brief history of reform efforts from roughly 1990 to the present, including respectful but frank judgments concerning their achievements and their limits.

A second section cross-cuts with the first. It categorizes reforms by issue, corresponding to the list above. Herein we also note innovative efforts in particular disciplines and on particular campuses and take account of relevant disciplinary differences—which, in many cases, are less salient than one might suppose. Our specific examples are intended as illustrative rather than comprehensive, and we look forward to publicizing others on the website that accompanies this report. (We have not considered the arts and science doctorates offered in other countries, but we invite a more global view. While our national Ph.D. often now serves, for better and worse, as a model for higher education elsewhere, we should know more about conventions and reforms internationally.)

Our concluding section considers the levers and incentives that could be deployed to counteract inertia, such as entrenched and unquestioned habit, lack of data, and narrow self-interest.

In that our report emphasizes the importance of translating ideals into policies and practices, it is crucial that those who undertake reforms talk to each other. We therefore propose to provide a website where programs and institutions can share information on concepts, strategies, and implementation. The websites of previous efforts have turned into beautiful graveyards of broken links that testify how noble initiatives have failed to make lasting change. Our site will provide a continuing a gravitational center for that discourse going forward: it will reduce redundancy of effort and offer ideas that may be borrowed or reshaped.

The formation of an ongoing discourse will help to make the field of graduate school reform distinct and rigorous. The site can become a helpful means, along with occasional conferences, for usefully adapting each other's best practices to local conditions while providing a continuing and growing sense of support among the willing.

Leonard Cassuto and Robert Weisbuch are the lead writers of the report, with important contributions from other members of our consultancy: Peter Bruns on reform in the sciences, and Johnnella Butler on diversity efforts. A.W. Strouse assisted in the final stages of composition. While the project has been funded by the Andrew Mellon Foundation, it was written independently. And though each of us has our own experiences and strong opinions concerning the Ph.D. and potential reforms, we have sought here to be primarily reportorial. At the same time, we are charged with looking forward, as such a review also should, to assess the current landscape of the Ph.D. in the arts and sciences, analyzing the strengths and limits of past reform efforts, and suggesting the future directions that arise from these considerations

Part One

PhD Reform Efforts, 1990-2015: A Summarizing History

1.

In this section of our report, we provide a context for the era of reform. We survey the studies and reports that have, among higher education leaders, reflected a growing sense of dysfunction in doctoral education in the arts and sciences Ph.D.

Doctoral education in the arts and sciences grew rapidly from 1962 to 1970, with double-digit annual growth in graduate students, tripling the annual total in less than a decade. (Over the ensuing 45 years, growth has been much slower, averaging between one and two percent per year, and including some small decreases.) With the heady increases in college attendance, the swelling of undergraduate enrollment in the humanities and social sciences and a growing and ambitious national agenda for the bench sciences tied to university research, the postwar doctorate became a highly desirable degree, promising great opportunity for its holders.

As early as the 1970s, though, this welcoming edifice began to teeter.[2] The number of academic positions in the humanities badly trailed the number of graduates, and unemployed or under-employed humanities PhD's became a commonplace. Cuts in federal and state funding of higher education limited the academic job market. That made cheap labor all too attractive, and those work conditions led to the rise of graduate student unionization. Unions began to appear at the same historical moment when conversations about institutional reform of grad programs were also starting to take place in earnest. One result of this confluence was infighting: the reform movement split between activism and pragmatics.[3]

Just as membership in a poorly paid, disrespected, and migratory adjunct work force has resulted for too many doctoral graduates in the humanities, career-stalling post-docs have confronted many graduates in the sciences. More recently, academic positions in the sciences have been in decline as federal and state support of higher education continues to decrease. Time to degree has remained terribly long, with over eight years from the start of a program to graduation now the norm in the humanities. And the cyclical grant-making mechanism of the sciences built a structure that relies on student populations to staff laboratories to do the work that would allow the grants to be renewed. Such research exigencies, then and now, have severely compromised the academic development of doctoral students. More generally, throughout the arts and sciences, a disconnect occurred between the kind of training research universities provided and the responsibilities of graduates hired as new professors in a wide variety of student-centered colleges and universities. The needs of those considering a non-academic career were largely ignored, and yet this group constitutes a very large minority in the humanities and a majority of students in the sciences.

College and university administrators, accustomed to abundance, long expected that it would one day return—so programs grew in anticipation of a return to previous funding levels that never arrived. The results were grievous in doctoral education in the arts and sciences: more and

more PhDs were produced and taught to expect professorships that never materialized. This disjunction informs many problems that developed—such as increased time to the PhD—and formed the basis for many of the ethical difficulties that plague doctoral education today.

The same disjunction helped push doctoral education toward incoherence. Perhaps the most-quoted sentence that powered reform efforts from 1990 forward appears in an influential Pew-sponsored 2001 report by Chris M. Golde and Timothy M. Dore titled, ominously, "At Cross Purposes": "The training doctoral students receive is not what they want, nor does it prepare them for the jobs they take."[4] Such frank pessimism still alternates with nostalgia. For example, Golde is also a co-author of a Carnegie volume in which the history of this nation's PhD is lauded as "By almost any measure…a tale of success—and a typically American one at that, as early educational leaders both borrowed from and departed from European models to fashion a new type of institution suited to the evolving needs of a young nation."[5]

Today's problems are not new. Speaking of the allure of the Ph.D. in 1903, William James wrote that "We dangle our three magic letters before the eyes of these predestined victims, and they swarm to us like moths to an electric flame."[6] More than a century later, Louis Menand (the author of one of the renowned studies of James), similarly scorned the waste of talent: "It takes three years to become a lawyer. It takes four years to become a doctor. But it takes from six to nine years, and sometimes longer, to be eligible to teach poetry to college students for a living… Lives are warped because of the length and uncertainty of the doctoral educational process."[7]

More frequently, a national pride in the doctorate combines with a growing unease. An important 1995 report from the Committee on Science, Engineering, and Public Policy, created by the three National Academies of Science, Engineering, and Medicine, *Reshaping the Graduate Education of Scientists and Engineers* (and often referred to simply as the COSEPUP report), published in 1995, reflected a confidence in these disciplines even while sensing a need for rethinking advanced education in them. The report begins by stating, "The U.S. system of graduate education in science and engineering is arguably the most effective system yet devised for advanced training in these fields." But the authors note that the end of the Cold War, new technologies, the increase in international competition, and greater constraints on research spending have changed the situation. Now, they said, there is "a slowdown in the growth of university positions" and a reduction in the demand for traditional researchers in some fields" and this has led—and here the scientists sound like their colleagues in the humanities— to "a frustration of expectations among new Ph.Ds."[8] Because there is "no clear human resources policy for advanced scientists and engineers,…their education is largely a byproduct of policies that support research"—to such an extent that the report needs to insist that "*The primary objective of graduate education is the education of students.*"[9]

This latter statement is worth pausing over. It cuts against the grain of the entire monolithic funding system of bench science in the United States. That system is designed to produce new knowledge—that is, new scientific results. These results are funded by grants that our labs compete for. Educated students are more of a byproduct of this system than a goal of it. Indeed, as employment prospects for PhDs in the bench sciences have become more jaundiced, many tenured lab leaders have chosen not to accept new graduate students; they employ a contingent

class of PhDs instead, a group whose postdoctoral existence correspondsed to the embittered army of adjuncts in the humanities fields. That a group of scientists on a prestigious and highly visible commission could declare fully a generation ago that the priorities of the system of graduate education in the sciences are disjointed speaks volumes about the inertia of that system—the structure which has of course changed almost not at all in the ensuing generation, despite increasing economic stress on its basic mechanism.

Surveys of former students at first seem to refute these concerns about the educational quality of the Ph.D. When former doctoral students in Mathematics and English who had completed the degree were asked, ten years later, the simple question, "Was completing your PhD worth it?" over 90 percent said that it was.[10] But this survey did not include the half of all entering students who never completed the degree. Further, this affirming result in part reflects the general propensity to affirm past decisions. And it is worth noting as well that just over half of the PhD's in both surveyed fields had gotten tenure-track jobs, and of those tenured, "only about 15% in mathematics and just under 10% of the Ph.Ds. in English were tenured at Research 1 institutions" which their education guided and encouraged them to desire. The total number of incoming students who wind up at such institutions works out to about 3 percent.[11]

Findings also suggest that those who had chosen non-academic employment reported high job satisfaction, and that only a third in English and a bit less than half in mathematics reported that their current job related directly or fairly well to their doctoral training.

Despite the prevalence of alt-ac careers, only 27 percent of mathematics graduates and 8 percent of English graduates responded that faculty had encouraged them to consider non-academic jobs. Even so, about 40 percent in English and 44 in Mathematics were working outside the professoriate. To put this in bald terms, most graduate students are never advised about a whole range of jobs that they are likely to consider—and perform. Such disparities give reason to the insistence of historian and philosopher of science, Yehuda Elkana, who says that "it is not enough to rethink the doctorate. We have to rethink the faculty."[12] The Woodrow Wilson report on its own initiative, *The Responsive Ph.D.* , observes that "students benefit immensely when faculty no longer conceive of themselves as guiding the next generation of scholar-teachers but as guiding the next generation of intellectual leaders, some of whom may become scholar-teachers."[13]

This reality of non-professorial outcomes sometimes informed and sometimes eluded even the reformers of the turn of the twenty-first century. Biologist Crispin Taylor notes, "few of today's science PhDs will become faculty… we ought to be thinking about how to develop doctoral programs that effectively prepare students for as many different career trajectories as possible."[14] Taylor's essay, however, appears in a volume subtitled "Preparing Stewards of the Discipline"— a phrase that evokes replication. The titles of companion volumes like *The Formation of Scholars* and the anthology *Paths to the Professoriate* indicate a strong prejudice for viewing graduate school as an exclusive preserve within which professors privately clone themselves..

Reform efforts have been vexed by contradiction. We have thought we knew what doctoral education in America meant and then we were no longer so certain. Is its aim to produce the

next generation of university scholar-teachers? At a deeper level, is the doctorate essentially, as its early American founders insisted, a degree intended to ensure robust scholarly and scientific discovery? In the United States, that purpose has always existed in tandem with a mandate to educate students, the tension being a historical legacy of the planting of the doctorate in an American higher educational field already filled with English colleges. The two have coexisted over these many generations, but their purposes are not entirely symbiotic. Research culture is fundamentally faculty-centered. Teaching shall be "secondary," wrote President William Rainey Harper in 1888 of the new University of Chicago, performed by researchers because "It is only the man who has made investigations who can teach others how to investigate."[15] That is, graduate school faculty make the best teachers because they can impart techniques of discovery, but they nevertheless shouldn't teach very much because they have more important work to do. Meanwhile the culture of the college model is student-centered. "The fundamental problem," says Nicholas Lemann, is that the U.S. has "adopted two noncongruent ideals of higher education."[16] The coexistence of the teaching and research missions in American higher education has informed its history for about a century and a half, and we need to be conscious of it. Must such alternatives be at war or can they coordinate?

Training in teaching gained an unsteady foothold once it was found that graduate students could serve as bargain-basement instructors, but historian Thomas Bender asserts that doctoral education in recent years may have moved backward, to become more traditionally oriented toward scholarship than ever before: "By the 1990's [the Ph.D.] could fairly be considered a research degree, pure and simple, perhaps even a hyper-research degree."[17] This movement was driven in large measure by the tightening academic job market, which drove the credentializing bar ever higher. And yet there has always been a loyal opposition to the purely scholarly degree, arising from the American ideal of democratized education as a means to produce citizens.

The composition of that citizenry is an important related issue—who are to be the doctoral graduates, the scholar-citizens? Given the heightened sense of the importance of cultural diversity within the United States, what does it mean that so few doctoral graduates have been scholar-teachers of color and that so many, especially in the sciences, have been citizens of other nations? This is not merely a question of equal opportunity, for representatives of differing backgrounds also bring with them differences in emphases and outlooks. Doctoral education has yet to benefit fully from the diversifying of the American intellect.

At this point, it is worth asking the always challenging question, so what? In any given year around 50,000 doctorates degrees are granted, compared to 1.8 million B.A. degrees—a ratio of one to 36.[18] The doctorate is a boutique by this reckoning. But by another measure, it is the very foundation of the rest of education, the bedrock of the society. This highest degree does not merely reflect the nature of each discipline, but typically a major role in shaping it; and the life of each discipline informs every level of education and many aspects of the culture at large. The Jeffersonian argument that a well-educated population leads to a better democracy applies to graduate as well as undergraduate education.

But doctoral education has not sought to fulfill this outward-looking vision for many years. Bender argues that the growth of the Ph.D. since 1945 "has enabled many academic disciplines

to turn inward on themselves, to become worlds of their own. However big and interesting these worlds may be, they are inevitably parochial, and their academic enclosure carries the risk of a new scholasticism."[19] As a result of this insular, inward turn, critics claim, scholarship itself suffers, sacrificing a necessary heterodoxy and cosmopolitan view.

While such insularity is not so readily apparent in the sciences, most of the major issues concerning the Ph.D. pervade all of the disciplines alike. In the 1990s, however, the attitudes of what C.P. Snow called "the two worlds" differed. The atmosphere in the humanities could be termed fraught, while the COSEPUP report of 1995 expressed pride and relative confidence in the state of the sciences. Yet there as well, the concerns centered on the quality of the educational process for students when considered beyond the research mission—and in questioning over-specialization, they implicated the quality of research training as well.

The central questions are whether there is a will for reform, who can get it done, and by what means. Each reform effort has sought answers, and it is to those efforts that we now turn.

<div align="center">2.</div>

Graduate Education Initiative (GEI) The Andrew W. Mellon Foundation.

Timeline: 1991-2000

Goals: Reduce time to degree in chosen humanities departments to six years; reduce attrition rates, particularly in later years of a student's graduate career; encourage improved efficiencies and better practices at the departmental level to reach these goals.

Participants: 54 departments at the 10 major universities attended by the greatest number of Mellon Humanities Fellowship Awardees; and several unfunded "control" programs at three additional well-resourced universities.

Strategy: Led by graduate deans at each university, departments would submit plans and subsequent reports for achieving the goals. Students making good progress would receive better financial support to speed their way and support degree completion. Mellon funding of nearly $84 million in all.

Results: Very small reduction in time to degree and attrition rates, though the enthusiastic departments showed more robust results. Extraordinary data base.

Key Publication: Ronald Ehrenberg, Harriet Zuckerman, Jeffrey Groen, and Sharon Brucker *Educating Scholars: Doctoral Education in the Humanities*, (Princeton UP, 2010).

The first reform effort of this period was also, at least financially, the most dramatic. In 1991, The Andrew W. Mellon Foundation's "Graduate Education Initiative" funded grants to 54 humanities departments (including the humanistic social sciences of anthropology and political science) at the ten research universities most often attended by Mellon fellowship awardees, with the aim of greater efficiency. Data from programs at three other unfunded universities would be considered as a control group. These 13 universities together accounted for 18 percent of all

PhDs in the humanities, a considerable number. The foundation selected two "key indicators" as measures of effectiveness: attrition rates and the average time to the Ph.D.[20]

William G. Bowen and Neil L. Rudenstine had determined that high attrition and long time to degree came about in part due to inadequate student funding—but they also discovered that simply increasing their stipends did not help, as fellowship recipients fared no better than the general doctoral population.[21] Thus the Mellon initiative determined to act through conditional funding to departments (with some supervisory attention from the deans of the graduate schools at each institution). To receive continuing funds, each department would have to reconsider the design of their doctoral programs. The funding would ultimately go to students, but only to those progressing in a timely manner.[22] At the same time, Mellon sought not to be too prescriptive. Programmatic changes had to "be consistent with….improving effectiveness, lowering attrition, shrinking [time to degree], redesigning programs, and funding graduate students in line with helping them move expeditiously toward completion."[23]

In all, nearly $85 million was expended over a decade to support these activities--$58 million in aid, an additional $22.5 million for sustaining the new practices after the formal period ended, and another $4 million-plus for planning grants and funds for data collection. Further, the project importantly included much data and analysis to attempt to determine links between practices and effects.

One obvious limitation of the project concerned the choice of universities, all among the nation's wealthiest and most prestigious. The lessons and data gathered at Harvard or Yale might not apply fully, or very much at all, elsewhere. Yet there is a follow-the-leaders ethic in higher education which supports Mellon's practice of rewarding the richest; and the very fact that a prestigious foundation was calling attention to problems at the doctoral level focused new attention on the issues.

The results, however, were disappointing. The report on the GEI is frank. To begin with, many programs did not live up to their agreement to reform their own practices. "Improving effectiveness was," the authors note, "a less pressing matter" for them than continuing graduate education in its set ways.[24]

The gains were modest indeed: over the eleven years surveyed, mean time to degree stood at 7.27 years before the initiative, and 6.98 years afterwards, a difference of about three and a half months. In comparison to the unfunded control programs, the difference was only a matter of weeks. Further, the mean time to attrition (that is, how soon a doctoral student chose to leave) declined in funded programs from 6.35 to 5.86 years, again only a bit better than in the control group.[25] The authors cite the poor job market as a possible cause for the program's poor results, but it seems clear that faculty recalcitrance was the prime reason.[26]

Despite the disappointing numbers, the GEI accomplished far more than might appear from a cursory and purely quantitative look. The Mellon researchers note that the necessary averaging of results masks some important differences, such as that 10 of the GEI-funded departments improved their eight-year completion rates by more than 20 percent.[27] Funded departments also

often reduced the size of entering cohorts, by two to three students on average, allowing for a greater concentration of monetary and faculty resources.

Moreover, there were a great number of improvements in department culture, as a survey suggests, in clarifying expectations, in curricular planning, in advising and mentoring, in group workshops, in reducing the number of semesters doctoral students spent teaching, and in greater summer and research support. These innovations may not have had much effect on the two targeted indicators of attrition and time to degree, but they did improve the student experience.

Extrapolating further from Mellon's survey data of outcomes, if we consider a sample of 40 entering students in these most prestigious programs, 22 would persist to degree (a 45% attrition rate), 12 to tenure-track positions, 6 of those at doctoral institutions, with 3 of the 6 appointed at a doctoral institution ranked in the top 50 by *US News & World Report*, and one more on the tenure track at a prestigious college. The ones who did not go into academia did not tend to become adjuncts; rather, they gravitated toward professional jobs.[28]

The data are extraordinarily suggestive and skillfully presented, but there is no denying the disappointing results. "There was no active disagreement with the goals of the GEI," the authors observe. "The faculty simply lacked the enthusiasm for the necessary changes or the continuity of leadership that could make them happen…. In some departments, the very idea of changing the program came as a shock."[29] One admires the patience evinced by such comments although one might also question, after expending $85 million on such marginal improvements, the lack of indignation. Since periodic reports to the foundation were required—in fact, the authors endorse "learning how well the intervention is proceeding while it is in process...if midcourse corrections are contemplated"—some departments were either exaggerating their activity or else getting a pass.[30]

"All told," the Mellon team concludes movingly, "redesigning doctoral education in the humanities has proved harder than imagined at the outset."[31] The Mellon effort makes plain that reforming doctoral study is no simple task. That is why we devote the last part of this report to instruments for supporting and spreading innovations.

Preparing Future Faculty (PFF). Association of American Colleges and Universities and The Council of Graduate Schools

Timeline: 1993 to the Present.

Goals: Expand professional development for graduate students to become effective teachers, active researchers and good academic citizens. Emphasis on teaching and service.

Participants: Varied through the years but at high point, 44 departments at 23 lead research universities with 130 partner departments at other kinds of higher-education institutions across eleven disciplines representing the sciences, humanities, and social sciences

Strategy: Graduate departments send students to undergraduate institutions within a cluster to shadow faculty

Results: 4000 graduate students involved over first decade but often minimal teaching experiences and little participation by most prestigious institutions

Key Publications: PFF Occasional Papers; J. Gaff, A. Pruitt-Logan, L. Sims, and D. Denecke, Preparing Future Faculty in the Humanities and Social Sciences: A Guide for Change (AACU and CGS, 2003); "Preparing Future Faculty, " pp.177-193 in Paths to the Professoriate.

Sponsored in 1993 by the Association of American Colleges and Universities and by the Council of Graduate Studies, and funded first by the Pew Trusts and then by the Atlantic Philanthropies and NSF, Preparing Future Faculty was designed to provide graduate students with experience at institutions other than the research universities where they receive their degrees—liberal arts colleges, community colleges, comprehensive universities such as branches of state universities—to observe and learn about faculty responsibilities in a variety of settings. "The key purpose of PFF," its leaders write, "is to promote expanded professional development for doctoral students." Not only do many doctoral students gain very little teaching experience in their home universities, but those who do often get assignments "that do not provide opportunities for grappling with the full array of serious intellectual and practical challenges of teaching, learning, and shaping an educational program."[32] The most important recommendation of the program leaders is that "The doctoral experience should provide increasingly independent and varied teaching responsibilities."[33]

The plan—to bring graduate students, who were being educated in research universities, into contact with people working at the kinds of professors' jobs that far outnumber those at research universities—was well-founded. The home university was expected to provide some kind of instruction in teaching and learning or faculty life and careers, or to offer designed sequences of teaching assignments, or at the least to deliver a workshop and "informal student activities." The partner institutions would "assign a faculty member to work with doctoral students, invite students to attend department or faculty meetings, include them in faculty development activities, and offer supervised teaching opportunities."[34]

Presented with a range of possible activities on both sides of the partnership, participants tended to provide the minimum (e.g. an occasional workshop or job shadowing program). Further, the service component at the partner institution meant simply internal committee work without public engagement. Thus, many Ph.D.-granting institutions opted not to participate at all because the benefits did not seem to justify the amount of time required of the student.

 If the effects of the Mellon initiative have been constrained by the choice of involving only elite programs, the PFF initiative proved limited by the opposite. A very high number of programs participated—first 17 lead universities, then 25 (with 130 partners) and a large number of disciplinary societies. That is a strength, and yet it was brought about by requiring very little of them—indeed, the leaders of PFF stressed its low cost.   But few of the most prestigious departments took part.

PFF is a superb conceptual design, and it persists in some graduate programs, usually in diluted form. But it may be faulted for not heeding one of the Mellon group's key recommendations, to "define the objective of the intervention clearly and repeatedly and to build in an enforcement mechanism.[35] Even so, a 2002 survey of PFF alumni who secured academic positions documented a positive reaction, with the preponderance believing that their PFF participation aided them in the job search, helped them to hit the teaching ground running at their new jobs, and even allowed them to immediately serve as resources to their new faculty colleagues.[36]

Perhaps more important, the most ambitious institutional participants—interestingly, those with the strongest reputations--did provide a helpful model for future collaborations between doctoral-granting universities and a range of other kinds of institutions of higher education. At Indiana University, twenty students each year spent a semester or a year teaching two courses each term with guidance from a faculty member. At the University of Washington, nine students working intensely with mentors from their department or a partner received scholarships for a quarter to design and teach a course or attempt an alternative instructional innovation. At Duke, the Biology department offered a teaching certificate that included a course in teaching and learning issues, teaching with supervision, faculty mentoring.

In retrospect, PFF demanded very little because its leaders were aware they were breaking new ground to provide teaching and faculty career issues a space in the realm of a Ph.D. degree. It is not condescending to say that perhaps the most important effect of PFF is that it existed and exists as an important reminder to more privileged students of a larger academic world beyond the institution that will award them their degrees. In the teaching section of the second part of this report, we will mention examples of other programs that, while not enlisting in PFF, propagated its values.

Re-envisioning the Ph.D. The University of Washington Graduate School.

Timeline: 1999-2002 (following a four-year longitudinal study)

Goals: To prepare students for a full range of roles and careers in the various social sectors, including those beyond higher education.

Participants: Extraordinary range of interviewees in academia, business, public education, non-profits, and government agencies

Strategy: To engage all parties in articulating a new PhD vision by conducting research on students, interviews with all stakeholders, bringing together the faculty mentors and the full range of potential employers, and to collect innovative practices.

Results: International website, extensive bibliography, compilation of 300 promising practices, national working conference with leaders from all sectors and an ongoing virtual discussion.

Key Publications: J.D. Nyquist, A. Austin, J. Sprague, and D. Wulff, "The Development of Graduate Students as Teaching Scholars: A Four-Year Longitudinal Study (2001; rpt

2004, pp. 46-73 in Paths to the Professoriate); Jody Nyquist and Bettina Woodford, The Ph.D: What Concerns Do We Have? (2000) on website; Nyquist, "The Ph.D: A Tapestry of Change for the 21ˢᵗ Century, 2002, Change, 34 (6), pp. 12-20

If PFF sought to widen the sense of teaching opportunities, the University of Washington went far beyond that in considering the Ph.D in terms of a whole range of outcomes that would include not only the spectrum of colleges and universities, but also K-12 schools, government agencies, non-profits, and industry. The project, write its leaders Jody Nyquist, Bettina Woodford, and Diane Rogers, "is built on the premise that doctoral education in not *owned* by any one educational level, type of institution, or social or academic constituency." Instead, "The analytical skills and problem-solving habits developed in Ph.D's are of great concern to a range of employers that hire Ph.D's both inside and outside of academia."[37]

Because it was based at a single institution, the Re-envisioning effort relied primarily on publishing reports that would document student attitudes and spread the word on innovative practices. It culminated in a major conference in 2000 and in a website that continued to describe promising practices for several years.

Beginning with a decidedly Jeffersonian definition of the goal of the doctorate, "to meet the needs of society," the project sought to provide "an environmental scan of the landscape of doctoral education," documenting concerns (the comment of the urban college dean above is one example among many) and innovations.[38] To do that, the leaders of the initiative spoke with the widest range of stakeholders yet considered in relation to the degree: students and faculty certainly, but also leaders of all kinds of institutions of higher education, of K-12, of government, of funding agencies, of foundations and non-profits, of disciplinary associations, of accrediting agencies even governance boards.

This range provided the initiative, undertaken by a single university and beholden to no outside agency, with a certain boldness of statement: "To safeguard its vitality, including its very raison d'etre, the Ph.D must get to know change, and must embrace it."[39] The project lists "three pervasive myths"—that research universities are solely responsible for determining the Ph.D. and that the graduates should emerge "in the tradition of their mentors; that traditional research is the only endeavor worth a student's time; and that graduate faculty know what is best for their students' career choices.[40] They proposed instead a vision that would adapt PFF's emphasis on the array of academic careers, and add to it a much greater emphasis on non-academic careers.

At the 2000 national conference, the Re-envisioning leaders convened representatives from all the sectors—producers and consumers alike—to consider what contributions each sector could make to the doctorate. Further, they established a very ambitious website "as a clearinghouse for transformative ideas and strategies," a bibliography of works concerning doctoral education, a description of 300 practices (some more promising than others), and links to 500 external partners. The conference itself was one of a kind, in which non-academics criticized some practices in the current model but also engaged the issues informing those practices.

This kind of conversation, so much more open and interesting than most of the conversations in a faculty lounge, has not been repeated in the ensuing fifteen years. It remains, however, a potential model for individual institutions as well perhaps for a renewed national initiative. And the Re-envisioning project itself encouraged others to create reforms, inspired perhaps by a statement from a graduate student quoted in a Re-envisioning report: "The academic environment is still very insular. And our society is not insular and people who are well-prepared should have a multitude of experiences and interactions with people in different sectors. And that's still not happening, it's still not there. And it's desperately needed."[41] Following the conference, the Woodrow Wilson National Fellowship Foundation, whose leaders had participated, worked closely with the Washington group to act upon what the Re-envisioning team had discovered.

The Humanities at Work. The Woodrow Wilson National Fellowship Foundation.

Timeline: 1999-2006 Goals: To encourage greater career opportunities within and beyond the professoriate for doctoral graduates in the humanities disciplines

Participants: 16 graduate schools for academic post-docs, 200 doctoral students for summer grants, 30 for career post-docs and 30 for academic postdocs, 30 corporations and non-profits

Strategy: Summer Practicum Grants and both non-academic and academic post-docs as model for graduate schools to emulate through their career and alumni offices

Results: A follow-up study in 2013 by the American Historical Association revealed a high degree of student satisfaction with experiences beyond the academy, especially by those who did follow academic careers.

Key Publications: Robert Weisbuch, "The Humanities and its Publics" American Council of Learned Societies Occasional Paper No. 61 (2006)

Reacting to the academic job shortage in the humanities disciplines, Woodrow Wilson led an initiative to suggest other careers for doctoral graduates. It sought to extend the reach of these disciplines into the social realms by two means.

First, current doctoral students could apply for modest summer stipends, "Practicum Grants" of up to $2000, to help support internships beyond the academy, with the caveat that they needed to find those opportunities for themselves. Over one hundred awards were made during a four-year period, with dynamic and hopeful results. A cultural anthropology student at the University of Texas worked at a home for delinquent teenage girls who had been molested as children, for example, employing autobiographical writing, dance, storytelling and drawings to improve the girls' self-images. An English student at Texas worked for NASA on the biographies of astronauts, and an Art History student at Stanford found a trove of Latino art at Self-Help Graphics in San Francisco and mounted an exhibit.[42]

The other effort, keyed more to the for-profit world, established over thirty "meaningful" job openings for doctoral graduates at such institutions as A.T. Kearny, the *Wall Street Journal*, Verizon, and the National Parks Service. The program, which continued for two years, provided a model that universities, with their alumni offices, could replicate-- perhaps with less difficulty. The Foundation also collaborated with several research universities to offer academic postdoctoral awards, as the foundation's directors felt that it needed to show that support for extra-academic careers did not constitute an abandonment of providing the next generation of scholar-teachers but an extension of it. The foundation provided $10,000 per year for two years for each postdoc while the participating universities provided double that sum and benefits.[43]

Intellectual Entrepreneurship Program. The University of Texas.

Timeline: 1997-2003. Continues to the present as undergraduate program.

Goals: Creating citizen-scholars to work on community challenges

Participants: UT Graduate School and a range of community groups

Results: Extremely high student participation, but ended by changes in graduate school administration. Continues at the undergraduate level.

Key Publications: Richard Cherwitz and Charlotte Sullivan, "Intellectual Entrepreneurship: A Vision for Graduate Education," Change Nov-Dec 2002, pp. 23-27.

This campus-specific effort, begun in 1997 by Richard Cherwitz, then the Associate Dean of the graduate school at the University of Texas at Austin, went beyond the humanities disciplines to enlist all graduate students in the arts and sciences in an effort "to discover how they can use their expertise to make meaningful and lasting differences in their academic disciplines and communities—to be what the program calls 'citizen scholars'."[44] The program offered several cross-disciplinary, credit-bearing elective courses along with internships in such matters as consulting, ethics, communication, and technology; worked with community organizations to create "synergy groups"; provided advice on portfolios for students; and established a consulting service. Students were encouraged to "develop visions for their academic and professional work by imagining the realm of possibilities for themselves"—to take greater ownership of their education, learn to think across disciplinary boundaries as well as the boundary of academia itself, and gain experience in collaborative work.[45] As a result, for instance, a doctoral student in mechanical engineering worked with an historian to develop storytelling techniques to increase scientific literacy. A PhD student in theatre working on the role of theatre in community development designed a business plan for a local arts incubator. A biology student, while pursuing specialized research, also developed means for explaining the more technical aspects of his field to a wide audience. And a government doctoral student in the wake of the September 11th attacks created an on-line network of political scientists interested in employing political theory to address real-world concerns.

In all, over 3000 students in 90 programs participated in the program, but it suffered from changes in deanships at the graduate level and ultimately moved out of the graduate school to become more of an undergraduate-oriented program, where it continues today.

The Responsive Ph.D.   The Woodrow Wilson National Fellowship Foundation

Timeline: 2001-2006

Goals: Student Diversity, Interdisciplinary Scholarship, Pedagogical Development, Career Options in all arts and science disciplines, Community Engagement.

Participants: 20 graduate schools and their Deans.

Results: Innovations in funding of programs, some strengthening of grad school deanships, local Data improvements, some career development centers added graduate mission, peer mentoring.

Key Publications: Robert Weisbuch, "Toward a Responsive Ph.D," pp. 217-235 in Paths; "The Responsive Ph.D.: Innovations in U.S. Doctoral Education" (pamphlet and cd), Woodrow Wilson, 2005; Diversity and the Ph.D.: A Review of Efforts to Broaden Race and Ethnicity in U.S. Doctoral Education" (pamphlet), Woodrow Wilson, 2005.

Given the Humanities at Work initiative, it was natural for Woodrow Wilson to participate in the Re-envisioning project, and the Foundation partly inherited the project following the conference in 2000. The purview included the social sciences and bench sciences as well as the humanities.

The Foundation enlisted fourteen universities at first and soon added six more. It sought range in geography and resources and a mix of public and private institutions. [46]

The initiative was organized through graduate deans: the Foundation saw graduate schools as struggling to exist, noting that at some universities "graduate deaning is a subfunction of the office of research" and that the very position of dean of graduate studies does not exist at some others. While noting that the success of doctoral education is significant in part because it "constitutes by far the most locally controlled, decentralized level of education," such decentralization also constitutes "our most balkanized and least regularly evaluated level of education."[47] The Foundation thus sought to support the very notion of graduate deanships by acting through them and by encouraging them, among other endeavors, to create local versions of the Re-envisioning dialogue between the producers and the consumers of doctoral degrees, in part because "by creating this dialogue the graduate school comes to exist more."[48]

The Foundation insisted upon action, noting that too many reports had led to very modest concrete results. Employing grants from the Pew Trusts and Atlantic Philanthropies, it seeded actual projects on the participating campuses in four areas.

 New Paradigms was the first, and it "evolved out of a rebellion among participants against the scholarship-as-enemy implication of some of the previous studies" and posed the question of what could encourage truly adventurous student scholarship.[49] A program at Duke allowed

doctoral students to take additional courses toward a cognate Master's degree at no additional cost—a forerunner to a current such program at Brown-- and another program at Arizona State provided special fellowships for students attempting interdisciplinary studies.[50] The initiative also encouraged campuses to apply to the National Science Foundation's Integrative Graduate Education, Research, and Teaching (IGERT) program, with its interdisciplinary emphasis.

New Practices focused on making pedagogy "truly developmental" and on enlarging the notion of service to include community engagement and career opportunities outside academia. Thus, both Howard and Duke offered certificates in teaching that encouraged greater work on teaching philosophies and strategies and even, at Howard, research into the learning process. The Intellectual Entrepreneurship program at Texas and the Preparing Future Professionals program at Arizona State, both mentioned above, were two efforts aimed at expanded service and more diverse career goals. Yale created a networking database to connect current students with alumni in sectors outside of academia and the career offices at Penn and Washington-St. Louis for the first time provided non-academic career advice and contacts for doctoral students. Colorado's Center for the Humanities and Arts offered internships for graduate students to explore the translation of their skills into non-academic settings. Combining these two themes of teaching and expanded service, Irvine created the Humanities Out There (HOT) program to promote collaborations with K-12 public schools while, similarly, Wisconsin's "K-Through-Infinity" initiative introduced STEM students to teaching in the schools.

"New People" aimed to recruit more students of color into doctoral programs. It resulted in a document, "Diversity and the Ph.D," which offered useable data and a set of recommendations to increase student recruitment. (Most provocative were those recommendations to make the disciplines more socially engaged, for refusing to choose between race and need as bases for fellowship aid because each requires funding, and for creating a "united nations" of funders so that efforts could be better coordinated.) In terms of campus initiatives, though, the results were disappointing. Michigan augmented its summer program of eight weeks of orientation for merit scholars, a practical introduction to graduate work, and Washington, Yale, and Wisconsin created peer mentoring and support groups; but there was a lack of truly new ideas.

Finally, New Partnerships picked up the theme of the Re-envisioning initiative to seek "an essential and continuous relationship between those who create the doctoral process and all those who employ its graduates."[51] While the deans involved did respond in various ways to strengthening bonds with the social sectors beyond academia, that one Re-envisioning conversation never really spread.

Even with the initiative's emphasis on concrete actions and its highly specific renderings of them in the "Responsive" booklet and CD (still available from the Woodrow Wilson National Fellowship Foundation along with the "Diversity and the Ph.D." report), it is unclear how many of them might have taken place regardless, for by design this initiative was targeted at a group of activist deans. Some designed programs around money—Duke and Washington universities instituted greater financial incentives for departments to innovate in student-centered ways, for instance—while several other deans worked to provide clear data on career outcomes to incoming students and to faculty. But there was no opportunity to add to the initiative or

disseminate what had been achieved. Woodrow Wilson changed direction soon afterwards, focusing on K-12 teacher training, and thus what was an impressive demonstration by these deans of what could be accomplished never gained the publicity that might have made many other institutions take notice.

Wilson's change in mission starting in the late 1990s related to a national trend that limited the publicity of these initiatives beyond their direct participants. Some major philanthropies, such as Atlantic Philanthropies and the Pew Trusts, got out of the higher education business. The growing interest in K-12 issues contributed to a lack of funding that led to the demise of such venerable non-profits as the American Association of Higher Education and the Council for Basic Education, as well as Woodrow Wilson's redirection. Then, too, a basic challenge had been revealed that is highlighted by this report: it takes a great deal to get a little done in doctoral education. With competing interests such as poverty and inequity, disease and health, and many more, the reform of doctoral education could appear to be a very expensive luxury, especially given the well-publicized wealth of the most renowned universities. Of course such wealth and the attendant reputation of a university in fact can cement the status quo and discourage change.

Carnegie Initiative on the Doctorate. The Carnegie Foundation for the Advancement of Teaching

Timeline: 2002-2006

Goals: Wise stewarding of the academic disciplines

Strategy: Raising basic questions of purpose and effectiveness in individual departments through leadership teams, with the commissioning of 16 essays as conversation starters

Participants: 84 departments and programs in 44 universities in six disciplines: Chemistry, Education, English, History, Mathematics, and Neuroscience

Results: Modest. Some changes in program requirements, newly created experiences, and customary interactions and practices.

Key Publications: George E. Walker, "The Carnegie Initiative on the Doctorate," pp. 236-249 in Paths; Chris Golde and Walker, eds., *Envisioning the Future of Doctoral Education: Preparing Stewards of the Disciplines* (Jossey-Bass, 2006); Walker et al, *The Formation of Scholars: Rethinking Doctoral Education for the Twenty-First Century* (Jossey-Bass, 2008)

This same trend away from higher education philanthropy finally hobbled another major effort, but one that left us with an extraordinary treasure trove of discussions of the Ph.D. The Carnegie Foundation for the Advancement of Teaching took a tack opposite to The Responsive Ph.D. in that it bypassed graduate schools to work instead with individual departments. "Honoring the disciplines" was their conclusion, or more precisely, "increasing power of the disciplines and the departments that house them."[52] However, the gifted leader of the Carnegie effort, George

Walker, also says that "appropriate modification of the incentive systems is more a top-down effort, carried out by leaders who look across the entire landscape an see how the elements fit together."[53] Yet while this might be the very description of a graduate dean, that office—and whatever duties it should have— goes unmentioned."[54]

The CID enlisted over 50 departments among six varied disciplines—chemistry, English, history, mathematics, neuroscience, and education—and first asked them to reflect on the goals of their programs and to consider whether their existing "curricula, practices, and assessments" of student progress "are robustly contributing to those outcomes."[55]

The idea of stewardship of disciplines was the only assumption that Carnegie explicitly presented. Stewardship was a concept "encompassing a set of knowledge and skills, as well as a set of principles" and an academic steward was one "capable of *generating* and critically evaluating new knowledge; of *conserving* the most important ideas and findings" and of "understanding how knowledge is *transforming* the world in which we live, and engaging in the transformational work of communicating their knowledge responsibly to others.[56] But perhaps the message to the faculty, a flattering one, was to say, you're in charge and you must be an enlightened and ethical agent.

Carnegie set before its stewards three skillfully phrased questions.

1. What is the purpose of the doctoral program? What does it mean to develop students as stewards? What are the desired outcomes of the program?
2. What is the rationale and educational purpose of each element of the doctoral program? Which elements of the program should be affirmed and retained? Which elements could usefully be changed or eliminated?
3. How do you know? What evidence aids in answering those questions? What evidence can be collected to determine whether changes serve the desired outcomes?[57]

One could argue that this emphasis on discussion gave faculty the very invitation to do what academics do all too readily, which is substitute endless debate for action. On the other hand, these questions encourage the stewards to question the assumptions behind their habits and turn them into queries. As the authors of the Carnegie report emphasize, they push against the habit of "conflict avoidance" that lead administrators to put their graduate programs on automatic pilot simply to keep departmental peace.

Some departments, such as English at Columbia under David Damrosch's leadership, were very usefully stirred into action. Columbia's English department began with a student survey that "provided a wealth of statistical information and many thoughtful, creative ideas for change, many of which made their way into our final package of reforms."[58] The University of Nebraska's mathematics department used the Carnegie questions to develop a document "that actually reflects what we believe," a statement "that fits on two sides of a sheet of paper; a description of the three possible career paths; and a list of eight goals."[59] That document is also used for assessment at exit interviews. At the University of Kansas, the traditional comprehensive exam had come to seem a "data dump" that placed a drag on time to degree. It was cashiered in favor of a professional portfolio, which students begin to compile in their very

first term. That portfolio includes a *cv*, research papers, any publications, a 15-20 page essay providing a rationale for the student's major fields, and related research issues, teaching materials, and a dissertation prospectus—all due one semester after course work is completed.

But these thoughtful practices these proved exceptions. The outcomes after five years confirm the skeptics: collected on a website ironically titled "The Keep," but now unused for several years, they are few and not very innovative. George Walker argues persuasively for a program goal signified by the acronym PART ("purposeful, assessable, reflective, and transparent"), then concludes, "But none of this can happen without a profound change in *faculty attitudes and habits*,"[60] a change that did not take place under Carnegie's gentle hand.

This result leaves us again face to face with the difficult challenge of who can achieve change and how, even with a strong consensus about what needs changing. But whatever the right levers are—and we believe some exist--the three basic questions raised by Carnegie should prove extremely useful for any effort going forward.

Diversity Efforts

We are describing under this heading various efforts at inclusion of under-represented groups in the doctoral student cohort. We should first note that most of the diversity efforts focus on student recruitment and financial support. Only a few take up the important questions of the experience of students of color and of women while they are actually participating in doctoral programs. We discuss the various initiatives in the section on Diversity in the second part of the report, with special emphasis on the extra-monetary efforts of the funds. What follows is a brief summary:

- *Ford Foundation Diversity Predoc, Dissertation, and Postdoc Fellowships (1966-present*): Ford currently funds 60 predoctoral fellows annually, providing $24,000 for each of the final three years of graduate study; 36 one-year Dissertation fellowships providing $25,000; and 20 post-docs at $45,000 per year for three years at partner institutions. The awards, administered by the National Academies of Science, Engineering, and Medicine, are for students who contribute in person or in their studies to diversity in the academy, in most disciplines of the arts and sciences. Awardees attend an annual conference and participate in a liaison network with past awardees and others.[61]
- *Gates Millennial Scholars* (1999-present); Primarily a program for funding under-represented minority students at the undergraduate level, administered by the United Negro College Fund, Gates also provides continuing support for those students who pursue graduate study in computer science, education, engineering, library science, mathematics, the sciences, and public health. Twenty-eight percent matriculate into Ph.D. programs in these fields, and another 17 percent into unfunded fields. Awards differ, in order to provide funds for unmet needs and to obviate pressures to work or incur debt.[62]
- *Southern Regional Education Board Doctoral Scholars Program* (1993-present; previously the Compact for Faculty Diversity). A partnership of state and institutional funding for students from under-represented groups, with the state providing the first three years of funding and the institution the final two, as well as a tuition rebate for all

five years. Additional funds are available for travel and research. Students in all arts and sciences fields are eligible, with special emphasis on (and at least half of total funding for) the STEM disciplines.[63]

- *Alfred P. Sloan Foundation Minority Ph.D. Program* (1995-present): provides funds to nine universities for mentoring of students of color in various STEM disciplines.[64]

- *Mellon Mays Undergraduate Fellows (MMUF) Dissertation and Travel and Research Grants* (1985-Present): Undergraduate fellows who continue to the doctoral level in the arts and sciences, with emphasis on the humanities, may apply for predoctoral research grants and, later, for Dissertation and Travel and Research Grants to aid in the completion of the Ph.D. As of 2014, over 4000 undergraduates had become fellows, with about 500 going on to earn the Ph.D.

- *Ronald E. McNair Post-Baccalaureate Achievement Program* (1986-Present): Administered by the U.S. Department of Education, provides grants on a competitive basis to universities (28 institutions, with over 100 programs represented to date) of typically $200,000 for each institution directed toward financial support and academic counseling for 20 to 30 disadvantaged students at each. Two-thirds of awardees are first-generation students from low-income families, with the remainder from under-represented groups only. The program is decentralized, with directors at individual campuses recruiting students and organizing their mentoring.[65]

- *NSF Alliance for Graduate Education and the Professoriate* (AGEP, 1998-Present): As of 2005, collaborates with related programs such as an NSF undergraduate research program and the Sloan Foundation's minority Ph.D. program to foster collaboration among institutions that encourage students in STEM disciplines.[66]

- *Council of Graduate Schools Award for Innovation in Promoting an Inclusive Graduate Community—now ETS (Education Testing Service) Award, previously Peterson's Award* (1994-present): Recognizes promising efforts from admissions through completion in a graduate degree program, with emphasis on improving the success of a diverse student population.[67]

- Also, on an international basis, the *Schlumberger Foundation Faculty for the Future Awards*, for women in developing nations pursuing the doctorate anywhere in the world in the STEM disciplines, currently makes 155 new awards annually. Several programs no longer are supported, including the GE Foundation Faculty for the Future Program, provided financial support for minority and women students in the sciences, engineering and business. Two others may be of special interest as potential models. *MOST* (*Minority Opportunities Through School Transformation*), administered by the American Sociology Association from 1994-2002, provided eleven departments with funds to address a more inclusive curriculum, better research training, enhanced mentoring, climate issues, and pipeline recruitment, at both the undergraduate and graduate levels, for students of color. As a result, more than half of courses included some consideration of diversity, minority majors almost doubled to 33 percent, and minority faculty rose from 22 to nearly 30 percent.[68] Finally, the *NSF program on Integrative Graduate Education and Research Training* (*IGERT*) combined an interest in increasing minority student participation in STEM and social science disciplines with new models of

interdisciplinary education and training from 1997 to 2012, resulting in a total of 215 awards to 100 institutions. IGERT also aided the sponsored programs in recruiting a diverse cohort of students.[69]

ACLS Public Fellows

Timeline: 2011-present

Goals: To expand the reach of doctoral education in the US by demonstrating that the capacities developed in the advanced study of the humanities have wide application.

Participants: ACLS, Mellon, Government and Non-Profit Organizations

Strategy: Places recent PhDs from the humanities and humanistic social sciences in two-year staff positions at partnering organizations

Results:

Key Publications:

2011-present

Funded by the Mellon Foundation, the ACLS public fellows program places up to 22 recent Ph.D.'s in the humanities and humanistic social sciences at select government and nonprofit organizations. The program is designed for those who make "an affirmative decision to commit their abilities and energy outside the classroom."[70] Fellows apply for specific positions within the host organizations, and the Mellon Foundation subsidizes their salaries for the first two years to smooth their touchdown into the nonacademic sector.[71] Fellows work in such positions as: Communications Manager (Tenement Museum of New York); Communications Program Analyst (Audubon Society); Legislative Studies Specialist (National Conference of Legislatures); Program Analyst for the American Bar Association Rule of Law Initiative; Senior Program Manager (Nexus at Carnegie Museum of Pittsburgh); Senior Manager of Audience Development (Public Radio International); Strategic Outreach Manager (Central Park Conservancy); and Policy Research Manager (American Civil Liberties Union). There are more than twenty such positions now.[72]

John Paul Christy, Director of Public Programs for ACLS, reports that ACLS has awarded 80 fellowships. Approximately 85% of fellows from the first cohorts are employed in their new career fields, while others have returned to academe to tenure-track positions.[73]

Initiatives at the American Historical Association (AHA): Career Diversity for Historians

Timeline: 2013-present

Goals: To better prepare graduate students and early-career historians for a range of career options, within and beyond the academy

Participants: AHA, Mellon, partner universities (U of Chicago, U of New Mexico, UCLA, Columbia U)

Strategy: Pilot programs launched at partner universities to prepare doctoral students to pursue a wide spectrum of career opportunities.

Results: Ongoing

Key Publications: AHA, "The Many Careers of History PhDs: A Study of Job Outcomes," 2013.

The AHA has been the most active disciplinary organization in devising and promoting alternative careers for Ph.D.s. In 2013 the AHA published a report on "The Many Careers of History PhDs" in 2013. Of the PhDs surveyed, one-quarter were employed outside the university.[74] This careful statistical analysis is based on extensive efforts to locate all PhDs who received their degrees between 1998 and 2009. It revealed that about half (50.6%) were tenured or held tenure-track positions at four-year institutions (with another 2.4% at two-year colleges). Approximately 15% were teaching in non-tenure track positions. About a quarter of all history PhDs granted during that period work outside of academia.

Through focus groups and interviews with historians the AHA identified five areas that Ph.D. preparation needs to include to make an historian an effective teacher, colleague, and researcher: presentation skills, collaborative experience, quantitative literacy, digital literacy, and intellectual self-confidence. Through its current pilot programs the AHA is developing ways to integrate such preparation into courses and curricula.[75]

Pilot initiatives are funded through a 2014 Mellon Foundation grant awarded to the AHA to demonstrate in practice how graduate programs in history can prepare students for alt-ac careers. This three-year project now funds pilot programs at four universities (Chicago, New Mexico, UCLA, and Columbia). At this writing Chicago and New Mexico have hosted workshops and conferences to think through and publicize the initiative. Chicago has developed events that focus on professionalization and skill-building and is placing students in internships to emphasize public speaking and outreach. New Mexico has implemented a monthly workshop series and employs faculty-student teams to maintain its fellowship placement program for career development. UCLA has hired a Graduate Career Officer who assists students in marketing themselves outside the academy, a move that is consistent with one of our recommendations in this report, and it has modified its curriculum to integrate professional development into course work, including classes on career preparation and on the various career trajectories available to historians. Columbia has created awards, courses, a conference, and History in Action Research Assistantships in which students work with host organizations to develop and apply their skills outside the university.

Modern Language Association (MLA): Connected Academics: Preparing Doctoral Students of Language and Literature for a Variety of Careers

Timeline: 20

Goals: To support initiatives aimed at demonstrating how doctoral education can develop students' capacities to bring the expertise they acquire in advanced humanistic study to a wide range of careers.

Participants: MLA, Mellon, partner institutions (Arizona State University, Georgetown University, and the University of California Humanities Research Institute)

Strategy: Pilot programs at partner institutions, compiling data on career paths, proseminars, mentoring activities, workshops.

Results: Ongoing

MLA, with Mellon support, launched Connected Academics: Preparing Doctoral Students of Language and Literature for a Variety of Careers in 2015. [76] The program encompasses related initiatives focused on careers for PhDs outside the professoriate.

Like the AHA, the MLA is sponsoring pilot PhD programs that emphasize alternative careers. These are housed at Arizona State and Georgetown universities, and the University of California Humanities Research Institute. At Arizona, the program focuses on mentoring across the timeline of graduate study, with advisors reviewing applicants and committing to a formalized mentoring relationship prior to student acceptance. Mentors correspond with mentees in advance of enrollment, assist them with course selection and background preparation, and facilitate the creation of a "doctoral advisement plan" in which students generate five-year graduate plans. Georgetown meanwhile is developing a prototype for a Center for Public Humanities as part of its initiative to integrate humanistic approaches into the public sector. The UC Humanities Research Institute is organizing twice-annual graduate career workshops.

MLA will host annual institutes at these locations to assess their programs, test models, and develop plans. Also as part of Connected Academics, the MLA is organizing yearlong, annual proseminars in New York City for students, recent grads, and adjuncts in the area. These proseminars focus on career issues in and outside of the academic, and participants receive stipends. As well, the MLA is expanding mentoring and networking activities at the MLA convention and organizing workshops for graduate program directors and placement officers. At its 2016 convention the MLA will host sessions on job-seeking skills for those seeking alt-ac jobs.

Also akin to the AHA, the MLA is collecting data on career paths of PhDs between 1998 and 2009; the two organizations are funded by the same Mellon Foundation grant for this purpose. The AHA has begun to publicize its findings, but the larger MLA study, which requires that researchers locate thousands more PhDs, is process.

Part Two: Concerns, Resources, Examples

In writing this section, we divide a large number of issues into two major categories: Policies, then Practices. But every specific concern could find a place under either of these categories, and separate issues intertwine and interdepend on each other. We take some note of many of these contingencies but readers will find still more.

There is one issue that is ubiquitous: a growing consensus that the main practical goal of the Ph.D. must be defined away from replenishing the professoriate, and should instead encompass more diverse career outcomes to create a more versatile, dynamic, and socially influential Ph.D. This goal is absent from some of the earlier reforms of the last quarter century, which focused on strengthening the pedagogical aspect of doctoral training while still assuming that higher education careers constituted the sole aim. The notion of more diverse outcomes has gained credence through a combination of desperation and information: studies have been published showing that nearly half of all humanities graduates do not wind up in tenure-track positions and that more than half of all Ph.D. scientists do not desire an academic career. Moreover, the emphasis on diverse career outcomes dovetails with the goal of creating citizen-scholars who can share their knowledge with a broad public for the public good,

This consensus among reformers on career diversity is not necessarily shared by those who administer and teach in most doctoral programs. And for those who have redefined their outcome goals, many questions arise. Here we move into issues of practice. How—if at all— should programs change their requirements? Since expertise remains the criterion for granting the Ph.D., simply letting job possibilities dictate the curriculum and the nature of examinations and dissertations will not do. The creation of multiple degree paths within any one program, an obvious alternative, carries the potential to create a first-class and tourist-class version of the degree. The result might be similar to the status problems that plague the Master's degree when it is offered as a consolation prize.

Some have argued that the master's degree ought to be the proper endpoint for those who seek careers outside of academia. If that is ever to be the case, more thought and attention—and support— must be given to master's degree programs than they currently enjoy. There are isolated fields (such as engineering) in which the master's degree confers an employable credential, and the very successful Professional Science Master's degree (PSM) is an exceptional example of a master's degree that was designed with employers' needs in mind, and with their consultation and input. But in most arts and sciences fields, master's degree programs lack coherence and support. That is one reason that the focus of this report is on doctoral education: because that is where the attention of graduate educators currently resides.

Of course the Ph.D. requires closer study as well. Policy issues like transparency and the publication of data have a practical side. What is the relevant data? To whom should it be addressed? How can outcomes be compared from university to university or even from program to program within a university?

Essential questions of practice loom as well. How can the degree ensure both depth and breadth? What makes for curricular coherence? Is a comprehensive examination the best coin of the realm for passage to the dissertation phase? What criteria define significant scholarship for a dissertation? Is refereed publication essential or best left to a next stage of the career? What are the chief responsibilities of a main advisor and what are the alternatives to that potential "tyranny of one"? How does departmental culture affect student learning—and how should it? What is the place not only of teaching but of pedagogy, or the study of student learning, in a PhD course? Are the disciplinary boundaries sufficiently malleable to allow for exploration and/or collaboration? And, a matter of import for many reformers, how can time to degree be reduced to economically and humanly defensible length?

We have left one major concern for a final and separate section, the ultimate policy issue. That is the question of how to ensure thoughtful change and more consequential innovation, for as several commentators have noted, there is significant agreement about what needs improving, but a discouraging disproportion between writing about changing the PhD and actually altering policies and practices to make change happen.

POLICIES

Admissions and Program Size   (See also Attrition, Diversity, and Assessment)

None of the reform efforts took up the question of admission standards. Whereas on many other issues, a consensus has formed that awaits action, this is an area where greater knowledge is required. For example, there is little understanding of the predictive capacity of the Graduate Record Exam (GRE) in relation to the actual performance of students. In the forthcoming *Faculty Gatekeeping in Graduate Education,* Julie Posselt notes that faculty members in the varied departments she studied are skeptical of the GRE and yet still employ it as a "magic bullet" to eliminate applications from consideration.[77] The GRE board itself defines the test's predictive capacity as "modest" and warns against employing a minimum score as a gate-keeping device. The board notes as well that undergraduate GPA appears to be a superior predictor of performance in graduate school.

Further, the development of an assessment for learning at the undergraduate level by the Educational Testing Service (ETS) itself suggests a need for a more usefully individualized measure of student attainment and potential. The general notion of "distance travelled"—that is, the levels of capability at which an undergraduate began and where she or he reached upon graduation—seems likely to provide a superior predictor of future development, and one that does not penalize students of color. In all, graduate programs should learn from the assessment revolution that is occurring.

But the GRE is only one example of an unquestioned assumption that is enshrined in the form of a highly consequential procedure. Despite an enormous and growing body of scholarship on undergraduate admissions, Posselt's new book will be the first one ever on graduate admissions. When it comes to graduate admissions, faculty lead a largely unexamined life.

We might therefore ask how a proposed revision of a doctoral program could be reflected in the application evidence that faculty members consider. How does a program assess applicants, and how does that assessment correlate with their subsequent performance?

Leonard Cassuto provides the first historical context for doctoral admissions in *The Graduate School Mess*.[78] He notes that historically, professors have sought students who will fit the profile of the faculty. Thus what Menand describes as "the production of the producers" starts early in the process.[79] These views are borne out in current practice by Posselt, who notes an inexorable "homophily," or "love of same," that pervades the process.

Of course, preserving the disciplines by this reproductive model has an important positive function. But it can block new knowledge that does not stay within the boundaries. It can also discourage original thinkers from even entering doctoral programs, and it ignores the many who do not wish simply to join the professoriate. Biologist Peter Bruns concludes that "In most cases, the goal in the sciences and engineering has been to produce researchers in the mold of the current faculty"—even though, in many science fields, more than half of all doctoral students do not expect to pursue academic careers. For example, only 35 percent of PhDs in Chemistry are employed at four-year colleges and universities, while 45 percent are in the private sector and 20 percent in governmental and non-profit organizations,.[80] In Physics, 62 percent of graduates took a postdoctoral position after obtaining the degree, but a recent survey of Ph.D. graduates ten to fifteen years later revealed dramatically different proportions: 45 percent remain in academia while the others have moved to government agencies or the private sector. And with so many humanists who have not secured academic positions added to the perennial 20 percent who have other plans, about 50 percent of all Ph.D.s across the disciplines will not become professors..

Surely such data should inform several policies of programs, including the admissions process. But there appear as yet no innovative challenges to the prevailing clone culture in this first stage of a graduate education. It remains all too predictable how a typical selection committee would view a PhD applicant in Philosophy or English who states explicitly that her goal is non-academic, or how a Chemistry program would respond to an applicant whose stated goal is to teach in a community college.

In terms of program size, however, there has been real change and improvement. Mellon's GEI initiative did lower the number of entering students by one or two on average in the programs surveyed, and many programs in the humanities have reduced numbers over a period of years. The Council of Graduate Schools reports a small but steady decline in enrollment in doctoral programs in arts and humanities over the past five years.[81] And Maryland's graduate dean cites an effort to "right size."

But what is the right size? Some commentators have suggested employing as a standard the number of academic positions achieved by graduates annually, and using that figure as the guide to how many new students to admit (with some leeway for attrition). Others have suggested limiting the number based on available financial support so that students might support themselves through scholarships and a not unreasonable amount of teaching.[82] But then diversity

efforts to recruit students from disadvantaged groups could be adversely affected. (We consider diversity issues more thoroughly below.)

There are other forms of diversity to consider as well. If doctoral cohorts shrink to a bare nub, then it is bound to affect intellectual diversity. The best-prepared are often the most traditionally prepared, and while there is nothing wrong with upholding tradition, educators should also anticipate and prepare for changes in tradition.

There is no consensus here. Doctoral programs at some public universities continue to grow because higher numbers translate to greater prestige—and because graduate student labor is necessary to maintain the system of undergraduate teaching. Other programs use the for-profit master's degree (i.e., no financial aid) as a kind of audition for doctoral study, which successful applicants enter only with a substantial debt load. We strongly discourage this practice.

Some reformers suggest that the size of the admitted class should depend on the ability to advise students on career possibilities beyond the academy as well as inside it. The rationale for this practice lies in the Jeffersonian idea that society at large benefits from more Ph.D.'s in its midst—as long as they are there by choice.

In scientific fields where more students seek non-academic careers, problems of overpopulation nonetheless have developed. Demand is down both in academia and also in industry--yet programs lack an incentive to shrink because high numbers of students often guarantee research funding. Right-sizing as an issue, in other words, cannot be eliminated by expanding career opportunities, even if the right size may become larger.

One casualty of right-sizing has been the part-time Ph.D. student, a creature once common in the humanities and humanistic social sciences. Part-time students made up the majority of American graduate students from 1967 until 2000, and amounted to about 55 percent of the total graduate-student population through the 1960s and 1970s, according to statistics collected by the Department of Education. But there's been a marked shift since the millennium. Full-time students now make up significantly more than half of all graduate students. In 2010, part-time students amounted to only 44 percent of the total, and that movement shows no sign of abating.

The national shift away from part-time graduate-school options has some reasonable motives. Many programs are shrinking because they want to give full support to more of the students they admit. They also don't want to overproduce Ph.D.'s for employment markets that can't accommodate them. But most part-time students already have jobs, so they don't necessarily need such protection from a bad market. Many are secondary school teachers who benefit from additional training. Some part-time students are willing to pay for graduate school because they enjoy it. Economist David C. Colander suggests that graduate schools ought to accommodate students who want to attend graduate school for pleasure.[83] Why should we deny such students a place, if they are qualified? Part-time students need not make up a majority of American graduate students as in times past, but we need not allow them to go extinct either.

Attrition

That about half of all entering doctoral students do not complete their degrees has often been cited as evidence that something is wrong with the degree. As Derek Bok notes, 90 percent of professional school students complete their graduate degrees, a painful contrast. High attrition in doctoral programs in the arts and sciences is a practice that dates back many generations, as the weeding out of large cohorts has long been employed as a lucrative alternative to turning away applicants at the door.

Clearly, some degree of attrition, perhaps half of the current rate, is healthy, as students find that advanced study is not what they supposed or that it would not lead to the career they desired. In fact, the Mellon initiative emphasized the desirability of early attrition, which corresponds to such changes of heart, and distinguishes it from years of drift in the later stages and late attrition due apparently to an inability to complete the dissertation. "High attrition rates and long [time to degree] clearly countered the interests of degree seekers. It was less often recognized that they also countered the interests of universities," costing students and schools alike large investments in time and funds "that were not yielding their desired outcomes."[84] The Mellon figures from the early 1980's for humanities students in its initiative's departments show that a little under half of those who depart programs do so in the first two years and a bit under 60 percent in the first three years, with about a quarter leaving as late as the 6th year and after and 15 percent in the 8th year and after.[85] By contrast, most science and math students who depart leave by year three, according to the Council of Graduate Schools while Mellon estimates that is true of only 60 percent of the humanities students in its initiative's departments who did not complete the degree.[86] A full quarter left in the sixth year or later, though its initiative reduced that number slightly.[87]

Mellon discovered that its initiative reduced attrition and improved completion primarily by "increasing clarity of timetables and encouraging students to finish their dissertations as soon as possible." Interestingly, quick completion reduced attrition as well and, less surprisingly, skillful advising mattered greatly (p. 153).

Cassuto notes that most faculty don't notice attrition at all and those who do "often blame the students themselves for leaving" (The Graduate School Mess, p. 115),[88]yet the Mellon researchers found that 81 percent of those who did leave earned one or another higher degree—a sign that they were not intellectually incapable.[89] And Barbara Lovitts concludes from her interviews with over 300 students who left programs at two different universities that "It is less the background characteristics students bring with them to the university than what happens to them after they enroll that affects decisions about completion."[90] Non-completers had the same undergraduate GPA as those who completed the degree and had, if anything, more helpful background experiences such as publishing an article or working with a team. In fact, non-completers "had close collegial relationships with faculty and other students as undergraduates, went to graduate school expecting more of the same, and became disappointed and disillusioned when their experiences did not meet their expectations."[91]

Why, then, do students leave? The quality of the advisor, the departmental culture, the inequitable distribution of resources, both financial and interactive, and a lack of interest in students "who have an interest in real-world applications" proved the deciding factors in Lovitt's study.[92]

Suggested remedies have been few, but Derek Bok suggests reducing the number of incoming slots for departments with excessive numbers of non-completers;[93] and chemist Angelica Stacey extends the principle to individual faculty: "What if faculty members were evaluated and rewarded, in part, on the basis of completion rates (how many of the students in your group complete the program)."[94] The CGS Degree Completion initiative takes a more consultative, several-stage approach. It recommends thoughtful admissions based on the fit of the student and the program, more frequent and thorough early-years assessment and advising, and reasonable financial support. But we are unaware in this key area of major program reforms that put into play either of these reform efforts.

Diversity

Justice Sonia Sotomayor emphasizes that diversity may begin with better student recruitment but it depends as well on the culture that exists for those who are recruited: "The dynamism of any diverse community depends not only on the diversity itself but on promoting a sense of belonging among those who formerly would have been considered and felt themselves outsiders."[95]

The initiatives and gains we reported in part one of this report augur well not merely for increasing the numbers of minority students over time but they also suggest a possibility for comprehensive institutional change. By their very nature, many of these programs intervene in the daily lives of the students, for instance with supplemental mentoring and student study groups. In fact, these diversity efforts well might include practices that could benefit all students in a graduate program. But most programs do not appear to have learned from these important examples.

The 2015 *Doctoral Initiative on Minority Attrition and Completion* conducted by the Council of Graduate Schools study's six research questions focus solely on STEM Ph.D. completion for under-represented minority (URM) students, for whom completion has been especially problematic. Among other findings, the study found that successful advisor-advisee relationships and an inclusive culture are particularly critical to URM success. But the study also noted the need for much greater understanding-- deeper quantitative and qualitative analyses of successful interventions at the undergraduate and graduate levels to define successful intervention and to better understand the reasons behind attrition, the challenges of pre- and post-candidacy, and reasons for extended periods of time for completion.[96]

But hypotheses already exist in some abundance. In her comprehensive discussion of the evolution and development of institutions addressing diversity, Daryl Smith advocates for comprehensive institutional change at all levels of education.[97] Invoking organizational change

and the production of multicultural scholars, Smith proposes defining the ideal culture as empowering and inclusive rather than simply advocating change.[98]

   Smith's work also discusses the significance to student success of individual experiences in institutional contexts that can function adversely. She categorizes several such: Threat (Will I fit? Can I participate fully? Will I be treated negatively if I report racism, or if I am undocumented? Will women be listened to and expected to speak?); Micro-aggressions (Can I handle minor but potentially threatening affronts?); Tokenism (Will I be taken as representative rather than as an individual? How can I manage my multiple identities? How will I manage the effects of status in the field as a woman, as a minority woman, as a minority male?); Institutional Isms (What institutional structures, policies, and standards embody inequity and affect particular groups negatively? Most important, these institutional isms are inessential to institutional mission, are implicit, and maintain inequities as part of institutional culture): Diversity and Divisiveness (Going beyond celebrating diversity and recognizing institutional and societal inequities often results in resorting to colorblindness or identity blindness. Counteracting this requires "building institutions that signal and manifest diversity in their culture"(55). And she emphasizes as a positive characteristic, Critical Mass, as it weakens the impact of tokenism and stereotypes: "It may be "that the complexity of critical mass reflects the complexity of identity itself" (p. 52). But Smith points out that because critical mass has not been achieved by many institutions, there have been few studies of its dynamics.

Tanya Figueroa and Sylvia Hurtado support Smith's views and provide insight into the experiences of URMs in doctoral programs through the study of 23 participants in focus group interviews. Presented at the Association for the Study of Higher Education in 2013, the results reveal that students "contended with three overarching challenges within their formal academic environments: 1) what students saw as the negative consequences of being 'underrepresented' in their program; 2) exclusion and conflict, and the ambiguous nature of those experiences; and 3) less ambiguous experiences of discrimination."[99]

These racialized and gendered experiences are read differently by the students, faculty, departments, and institutions due to the ambiguity emanating from different power relationship perspectives. Figueroa and Hurtado suggest the need for longitudinal studies that connect experiences to degree outcomes, including the experiences of those who leave programs: "the story that remains untold is what occurs when challenges in graduate school become overwhelming for URM students."[100]

This study echoes the recommendations of the CGS report and should be read in concert with the 2014 "Report on the MLA Task Force on Doctoral Study in Modern Language and Literature" and the MLA 2010 "Data on Humanities Doctorate Recipients and Faculty Members by Race and Ethnicity."[101] Here as elsewhere, there is a close likeness across the disciplines so that although the greatest amount of work has been done in the STEM fields, the conclusions are readily applicable across the arts and sciences.

Two projects lay the groundwork for larger institutional change: "The Minority Opportunities through School Transformation Program (MOST, 1994-2002), the initiative of the American

Sociological Association that uniquely concentrated on departments, focused on undergraduates and faculty but is instructive for doctoral programs; and the NSF program, "Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers" (ADVANCE).

Felice Levine, former Executive Officer of the American Sociological Association and the program's key architect, explained that MOST, Like the Carnegie initiative, chose departments as the focus because they "have the capacity to initiate curriculum changes, recast the academic climate in which majors learn, make deliberate choices about mentoring, and conduct their own recruitment and training. We considered departments to be the strategic location of change in higher education and the project's results bear us out."[102] The focus on diversifying course content, improving mentoring, and increasing numbers of minority faculty is instructive for graduate education and increasing Ph.D. completion, particularly in light of the research of Smith and Figueroa and Hurtado.

The NSF ADVANCE Program (Increasing the Participation and Advancement of Women in Academic Science and Engineering Careers) since 2001 has sought to recruit more women to academic STEM careers; and to promote gender equity in the workforce. ADVANCE has three tracks: Institution Transformation (IT), which is "meant to produce large-scale comprehensive change and serve as a locus for research" on equity and institutions; Institutional Catalyst (IT Catalyst), which urges self-assessments and implementing unique strategies, and Partnerships for Learning and Adaptation Networks (PLAN), which creates a network for "adapting, implementing, and creating knowledge" about practices in a particular discipline and across institutions

There is not a comparable program advancing Ph.D. completion in the humanities or social sciences that addresses institutional transformation so precisely and comprehensively at the departmental and institutional level or that builds on lessons learned as catalysts for institutional change. ADVANCE requires data tracking of scholarly productivity/research awards to women; of the increase or decrease of the numbers of tenure track women faculty; of departmental and campus-wide initiatives, and of cross-campus initiatives.[103]

But we do have some evidence that connects the recruitment of students of color and of women to how we define the nature of the doctorate in non-science fields as well. Barbara Lovitts notes that women and students of color leave doctoral programs in greater numbers than men and white students and sees as a cause that "women and minorities often have a style of interaction and an interest in research questions that do not conform with prevailing norms.[104] More specifically, in their study of students of color in the essay "Theories and Strategies of Academic Career Socialization," James Soto Antony and Edward Taylor argue that "The first tension that must be confronted is the traditional distance between service and research" and that the students "operated in a mindset that says research *must* be of service."[105]

Here too we might recall the recommendations of the Woodrow Wilson study of diversity and the doctorate for creating an alliance of funders, for funding both on the basis of under-representation by race and by income level, and for considering the intellectual and

programmatic adaptations that a culture and consciousness of diversity encourage. And in terms of an alliance of funders, we would add to such a coalition those organizations that support diversity in undergraduate education, as they could be called upon to promote the possibility of study beyond the B.A.

Finally, while there are any number of examples of campus initiatives, the most interesting of them may be a program at the University of California at Irvine, The Fast Track to the Professoriate. It provides students of color with a pre-graduate summer seminar, resources during their program years, and an innovative funding package that rewards advancement, including a portable post-doc fellowship that can be used at any research or teaching institution.

Data and Assessment

All reform efforts encourage more data and more assessment. In fact, all report a certain self-shock within programs when they discover how little they know about themselves. When the Mellon Foundation asked its ten participating graduate schools for simple information on time to degree and for attrition rates in various programs, only five could provide them—"The historical records of the other five were simply not up to the task."[106] When Columbia's English department sought to survey its graduates of the last decade, writes David Damrosch, "all too typically, neither our department nor the graduate school had any adequate record of our graduates' addresses, much less those of people who had left the program before graduation."[107] Chemist Angelica Stacy comments, "In a field that is devoted to results, we are oddly uninterested in the result of our efforts with graduate students."[108]

There exists a full consensus among reformers for programs

1.   to provide greater transparency to students and potential students on program expectations and career outcomes of graduates;
2.   to collect more careful data for the faculty in programs to consider not only outcomes but also the views of current and recent students;
3.   to ensure early and frequent assessments of their work to students;
4.   and to develop self-assessments by programs of student learning and the degree to which they are fulfilling their goals.

There are thorny questions concerning what data is most important and to whom it should be distributed. But separate reform efforts have developed several instruments for tackling these issues.[109]

Aside from these national resources and potential models, some graduate schools have tackled the issue of transparency and program assessment. In the Responsive Ph.D. initiative at Woodrow Wilson, four universities—Duke, Indiana, Texas, and the University of Washington—created data banks on departmental expectations, time to degree, career placements, and other selected program data. Duke's online program is detailed in the Wilson Responsive Ph.D. booklet and CD.[110]

If programs are to assess students effectively, the students need clear information about expectations and goals for them. Lovitts notes that students at their orientations often receive an

impossibly thick book of regulations; the Mathematics department at the University of Nebraska-Lincoln, as part of the Carnegie initiative, developed a two-page "Purpose of the Program" handout outlining three career paths, a list of eight learning goals, and other expectations. Better, the department conducted exit interviews with every student who left the program, either before or after graduation, on whether the program met the stated goals.[111] Also as part of the Carnegie initiative, the English Department at Columbia undertook a thorough survey of current students, "asking eighty questions covering every facet of the program" that elicited, in the words of the department chair, "a wealth of statistical information and many thoughtful, creative ideas for change, many of which made their way into our final package of reforms."

The three basic questions posed by Carnegie to programs—essentially, what are your goals, do your practices support those goals, and how do you know?—offer an exemplary focus for any program self-evaluation. In *The Assessment of Doctoral Education*, the Carnegie Initiative proposes a program self-assessment with these excellent three beginning questions and adds six useful further questions to ask of any program innovation—roughly, what is the issue, how do you know it is a worthy issue, what is the change, what is the intended effect, why did we select this approach, and how will we know if it is succeeding?

Probably the most difficult form of assessment involves student learning. Nancy Borkowski makes the persuasive point that "If we can use the assessment process, improve our programs based on stated results, and then articulate our results to our publics and stakeholders, we will bridge what many have considered a widening gap" between government agencies and the public on one side and academic communities on the other.[112]

Developing a sophisticated means for evaluating student learning is a major challenge and data collection and program assessment, conducted well, constitute major efforts. Without a strong graduate school and dean to organize efforts, asking each department to develop means may prove so time-consuming as to be implausible. And unless data can be fed back to an engaged faculty ready to consider it in an open, undefensive manner, the faculty will remain uneducated about its own programs and its own students.

Student Support

Funding of graduate students varies widely from institution to institution and from field to field, but it is most often low, considering the time to degree. Consider the comment of the English department chair at Columbia who learned to his surprise, from a student survey, that most of the students the department considered fully funded needed an outside job, of 15 hours a week on average, to support themselves.[113] Furthermore, graduate students, like undergraduates, take out loans to finance their degrees. Students borrow an average of $25,000 for graduate study, and their degrees do not necessarily lead to the jobs that they expect.[114] And health insurance for graduate students has become a major source of campus tension. As administrators attempt to comply with new federal health insurance legislation, graduate students have lost benefits and have increasingly organized activist campaigns.[115]

In this area more than any other, the sciences have specific issues that differ from those in non-laboratory disciplines, and we might here take some time to discuss science degree programs generally.

Our contributing colleague Peter Bruns notes that science and engineering degrees represent the fastest growing Ph.D. disciplines, having grown in graduates from 2002 to 2012 by 45 percent while degrees in all other fields declined slightly, by 1.5 percent. Science and engineering students constitute 70 percent of all doctoral degree earners. Their programs resemble others in being primarily faculty-driven, but they rely less on any institutional infrastructure.

Much of the student funding in the sciences, and far more than in the humanities or humanistic social sciences, is external to the university: research assistantships, training grants, and public or private fellowships; and the need for external support has often contributed to, in some ways determined, the specific design of programs. Doctoral education in the sciences has generally been characterized by some course preparation, but mostly by apprentice-type research experiences, directed by single faculty and tied strongly to the faculty member's research interests. Support through teaching is seen as a consolation prize for students not included on research grant support, and the result is an under-emphasis on pedagogical training. (See the section on Pedagogy below.)

But the longest-standing issue concerns the predominance of research assistantships, in which the faculty interest may well subsume the student learning process, and the relative scarcity of training grants which privilege the student's own development and capacity to shape questions. As an example, the National Institutes of Health report to the Director (2012) notes that in 1979, about 7500 students were supported by working on their professor's grant while nearly as many had traineeships and about a like number had fellowships. But by 2009, 25,000 students were supported by working on their professor's grant while the number of traineeships remained flat at 7500. In all, research assistantships increased from about one quarter of all student support to nearly half.[116]

The advisory group thus recommends that "NIH should increase the proportion of graduate students supported by training grants and fellowships compared to those supported by research project grants," a recommendation that as yet has gone unheeded.[117] Chemist Angelica Stacy goes further still, to suggest that funds be provided directly to students who then are free to choose their advisor.[118]

There are a few exceptions to the general lack of enacting the recommendation. One NIH institute now urges that research grants should include plans to promote student development, such as enhanced mentoring and means for accelerating time to degree (*Investing in the Future, Strategic Plan for Biomedical and Behavioral Research Training*, 2011). Further, the National Science Foundation has initiated a Research Traineeship Program with a first deadline in May, 2016. One track will support conventional but comprehensive training programs, especially for the fields of data-enabled science and engineering, while another track, labeled Innovations in Graduate Education, is intended to provide a test bed for novel training approaches in new areas of science. Between 24 and 30 awards will be funded for a total of almost $38 million.

In non-science fields, there has been a growing tendency, especially among well-resourced universities, to guarantee several years of funding for the most promising new students and occasionally for all of a reduced number of entering students. But the Mellon researchers note that while such support may attract talented students to graduate study and improve their lives while in school, "fellowship recipients did not have appreciably higher rates of completion than their classmates, nor did they have substantially shorter [time to degree]."[119] "A plausible scenario is that students with guaranteed funding stay longer and drop out later than they would have done" without any guarantee.[120] And the researchers note ruefully that the Mellon initiative "is responsible (contrary to its original intent) for much of the upward trend in multiyear packages….,"[121] where the original intent had been to make funding in the selected programs conditional upon "achieving specified steps toward the degree."[122] Clearly, most of the programs did not make funding conditional as recommended. Even so, "more generous financial support is associated with better outcomes" at least in comparison to those students who received no aid.[123] But the findings suggest that more aid without more planning and program reform is not a good bargain for institutions other than as a recruiting method.

Nonetheless, another Mellon finding emphasizes the importance of summer support. "Targeted funding during the summer has great potential to improve both the efficiency and the quality of the education of scholars—it requires modest resources and permits students to focus on graduate study."[124]   Finally, some other reform concerns have implications for student support. If programs are to be encouraged to be more transdisciplinary, Kenneth Prewitt notes, "the ambitious call for learning and training that will break through disciplinary boundaries requires equally ambitious changes in administrative and budgeting strategies," including student support.[125] And another concern, for developing non-academic career options, raises the possibility of also expanding kinds of support so that, instead of a teaching assistantship one semester, a student might intern in an off-campus endeavor or, in fact, in an office of the university itself (say, publications and media or student affairs or development or undergraduate admissions). As one example among many, at the University of California at Davis, a year-long "Professors for the Future" fellowship allows fellows to work on a project that will enhance fellow students' graduate or post-doctoral training. And the University of North Carolina's Royster Society of Fellows provides mentoring and professional development opportunities to selected students.

Professional Identity and Public Engagement

Surveys of graduate students suggest that many Ph.D. candidates begin their programs with under-informed or even inchoate ideas concerning their career goals and that their ambitions become more precisely formed—and sometimes impractically narrowed—during the first years of study. The process of professionalizing can be thrilling or off-putting; and, largely considered, it includes everything that takes place in a student's experience of a program.

In this particular section, though, we focus on reform attempts to broaden the notion of professionalizing, a process that always includes an assumption of what the student cohort is

being professionalized into doing. If as many students will not enter the professoriate as those who do, and if programs acknowledge and prepare for this enlarged range of eventualities, the notion of being a public scholar in its many definitions appears attractive for all students. Accordingly, we recommend that programs institute professional development seminars and require of them of their graduate students early in their coursework. These seminars should be designed to expose graduate students to the culture of the academic profession, and also to the possibilities that lie beyond it.[126]

The growing trend—really a restoration-- toward a more socially engaged academy may serve powerfully both future academics and those who take their learning into other social sectors. While a requirement that doctoral expertise must always respond to social challenges is unwise, a large number of graduate students wish to have the Ph.D. look outward to a greater extent and to apply advanced learning to all sectors of society—and in turn to bring the experiential into the Ph.D. classroom and lab. Golde and Dore report that over half of doctoral students want to provide community service, whereas less than one in five report being prepared to do so.[127] In fact, Lovitts found that a significant number of program non-completers left because of a sense of irrelevancy.   She warns that "losing students who have an interest in real-world applications means that important, socially relevant questions are not getting asked, much less answered."[128] The Re-envisioning leaders second the admonition of Frank Rhodes that universities "require new partnerships outside (academia) with communities; local, state, and national agencies,; corporations, foundations, hospitals;…" and so on.[129] Similarly, the Responsive Ph.D. initiative urges an expanded notion of service beyond committee work "to connote the rigorous application of knowledge to the social sphere."[130]

Doctoral education is a latecomer to a Dewey-like move in colleges and universities away from a hermetic stance. In Dewey's words, as one example philosophy "recovers itself…when it ceases to be a device for dealing with the problems of philosophers and becomes a method, cultivated by philosophers, for dealing with the problems of men."[131] is a return to an earlier model, for most private colleges were instituted by religious groups with an ideal of learning that would serve society, just as, with a vastly different rhetoric, public usefulness was the prime tenet in the founding of land-grant state universities. Thus in his excellent short history of higher education, Douglas C. Bennett lists experiential and service learning, in a list of six "frontiers of innovation."[132]   Likewise, Andrew Delbanco concludes his recent book *College: What it Was Is, and Should Be*, with a set of examples of "a growing movement promoting education for citizenship."[133]   And the religious studies scholar Jacques Berlinerblau urges an "engaged humanism," warning that "the humanities had better start serving people, people who are not professional humanists."[134] This may constitute a call for humanities programs to imitate the sciences where "tech transfer" is a going norm, but many science reports also call for their programs to take a more publicly-aware stance.

At the doctoral level, the emphasis on a more engaged academy has implications for the relation between aspiring scholars and their intended audiences. Heeding that requirement, Stanford University instituted the I-RITE program "to assist young scholars to communicate the significance of their research, to a larger public, including undergraduate students, funders,

policymakers, and laypersons." The program "requires connecting research to public concerns" and "asks students beginning their dissertation work to write a brief description of their research that would be accessible to undergraduates in an introductory course in the field. A network of peer reviewers then provides feedback for revision."[135] Since it began in 1999, the program has been adopted by more than 400 campuses internationally. Similarly, Duke University recently proposed that graduate students be required to film thirty- to sixty-second videos describing their dissertations in which they "speak in plain English" for non-academic audiences; and Duke has established a Forum for Scholars and Publics using various media.[136] As Cassuto notes, "Learning how to reach multiple audiences is not just a skill. It's a way of looking at the world that enables you to see complementary alternatives to specialization—and a need to forge ties outside the small world of specialists." Historian Thomas Bender describes this "bilingualism" as essential for doctoral students.

But action must supersede talk in the public arena, and several initiatives involve graduate students in community initiatives, much as the Humanities at Work project once did. At the University of Wisconsin-Madison, the Public Humanities Exchange (HEX) has graduate students work outside the university, in one case, for example, creating reading and creative-writing groups for recently released prisoners, in another a media-literacy program for middle-school girls that a student writing in the field of girl studies created to get a more actual sense of her subject.[137] And at Claremont University, graduate fellows in many disciplines consult non-profit organizations. Of course, the ACLS initiative that places humanities post-docs in a range of non-profit institutions is a particularly ambitious undertaking. But the ACLS initiative has generated increased interest from host organizations, even as it instituted cost-sharing measures, and it has inspired similar initiatives at the predoctoral stage.[138]

Other Ph.D. initiatives on particular campuses seek to shoot the wide gap between K-12 and higher ed. Again at Wisconsin-Madison, the K-Through-Infinity initiative (KTI) provides a fellowship and training opportunity for doctoral students in the STEM disciplines to serve as resources in K-12 schools. Teams of student fellows, teachers, school administrators, and occasionally university researchers work on curricular and pedagogical innovations for one to three years. A weeklong initiative at the University of Washington, Connecting the Community, provides a weeklong institute for 25 humanities students on public scholarship and actual community-university projects. And the Humanities Out There (HOT) program at the University of California-Irvine engages graduate students with teachers and faculty "to achieve a deeper understanding of both disciplinary research and K-12 classroom practice."[139] Students meet with host teachers to discuss content and objectives, develop assignments, train a team of undergraduate tutors, and teach a unit once a week for five weeks. They also attend a yearlong seminar on humanities and the public sphere.

Ambitious related initiatives are currently underway at the MLA and AHA to integrate the idea of career diversity into the curriculum of doctoral education in the arts and sciences. Funded by the Mellon Foundation, each of these organizations is sponsoring pilot PhD programs purpose-designed to prepare students for careers outside academia as well as inside of it. The AHA program, a three-year initiative, is taking place at four institutions (Chicago, New Mexico,

UCLA, and Columbia), while the MLA's version, ppart of a larger program called Connected Academics, has begun at three (Georgetown, Arizona State, and the University of California Humanities Research Institute). (For further details see part one of this report.)

These programs are following a trail blazed by the German department at the university of Colorado at Boulder, which in 2012 began a PhD program aimed to prepare students for diverse careers over a four-year time to degree, about half of the national average. The program will graduate its first class next year.[140]

Reformers had long called for "crossing the T," for going broad as well as going deep; but the objection has been that going deep is essential and difficult. The kind of expanded professional identity here espoused offers examples of how going broad can also mean going deeper still. The examples cited earlier in describing the "Humanities at Work" program are striking in that, of over 100 participating students, "To a person, they note a new appreciation of the power of their discipline, a sense of how much they might accomplish in various venues, and an improvement in the writing of the dissertation because of the experience."[141]

Time to Degree

Time to degree, even when calculated most conservatively as actual years when a student is actively engaged in pursuing the doctoral degree, yields troubling results. Most data shows that 8 years is the norm in the humanities and 6 to 7 in the sciences along with, in a field like neuroscience, a postdoctoral period that "stretches to four or five years."[142] In fact biologist Crispin Taylor urges adding in the "subsequent period that has become *de rigueur* in the sciences and in the humanities" via postdocs and adjunct positions. But even without that, the average age for graduates in the humanities is 33--surely one of the world's longest periods of adolescence.

Louis Menand notes that an 8 to 9 year degree for a student who desires further education but may not want to become a professor discourages that student from entering a doctoral program at all: "The result is a narrowing of the intellectual range and diversity of those entering," he writes "and a widening of the philosophical and attitudinal gap that separates academic from non-academic intellectuals."[143]

Yet time to degree is the area where reformers and traditionalist faculty most contend. The Carnegie initiative notes that "Where the gold standard for newly minted Ph.D's twenty five years ago was likely to be the promise of significant research productivity, today's job postings…are likely to call for 'a proven record of success,' a 'history of publication' and "demonstrated facility' in the teaching area."[144] As academic jobs have become harder to get, "new elements" have been added to programs, and no old ones have been excised to make room. In other words, demonstrated achievement is now required, when potential was once sufficient—and achievement takes years.

Clearly, the cost to institutions and individuals of the lengthy doctorate is very high and may in fact dissuade any number of talented students from pursuing the Ph.D. at all and opting for a

professional degree instead. It also reduces the time of what chemist Alvin Kwiram terms "the window of creativity" when a scientist finally can propose her own program of research.

Yet many faculty see their program requirements as utterly necessary and simply will not consider such practical matters as a person's finances and timely progress in life. The Mellon researchers finally surrendered to faculty opinion, noting that faculty simply did not see time to degree as an important concern. "Insisting on 'fast' degrees is likely to evoke resistance from faculty members, whose role in graduate education is central."[145]

Mellon's goal for a "fast" degree had been six years. That a six-year norm should seem radical suggests to some observers how extreme the situation has become. Thus Mellon maintains, "Instituting incentives and deadlines for satisfactory progress does seem the better choice," and the writers note as well that "those who took eight years or longer to complete their degrees (about half of the sample) were less likely to find jobs on the tenure track than their counterparts who finished more quickly."[146] Such an observation might make an institution ready to confront whatever resistance occurs and to refuse it.

At an opposing extreme to the status quo, Menand urges a three-year doctorate with a publishable article substituting in non-science fields for a dissertation. And chemist Alvin Kwiram notes that "students in the United Kingdom are expected to complete their Ph.D. studies in three years" with exceptions made only reluctantly while students in Germany typically take three years after earning the equivalent of an Master's, thus five years overall.[147]

A finding of the Mellon researchers that may give support to both sides of the argument is that students in the Mellon study who published while in graduate programs tended to finish their degrees faster, "while slower completers had significantly lower numbers of publications" and less success on the academic job market. At first glance, this finding suggests that the publishing "arms race" does not appear by itself to extend time to degree greatly Of course, the Mellon data considers only students who are in programs that support students more generously than most, and thus early completion with published work may be tied to financial support. It seems logical that the informal but insistent requirement for publication would add time to completing the degree. On the other hand, it may suggest that programs that encourage timely completion instill a professional attitude that results in higher quality work.

The Mellon researchers found that three factors were most crucial in shortening time to degree: clear expectations, better advising, and better financial support tied to requirements for timely progress.[148] Other suggestions include streamlining pre-dissertation examinations either by offering summer courses to prepare students or by including the requirement of a dissertation prospectus as a part of the exam. (See in particular the section below on Exams.)

Consider the shared expectation among faculty and administrators that college—earning the B.A. degree--will take four years. If undergraduate programs did not begin with a time norm, but simply listed all desirable achievements for undergraduates, college might easily take eight or ten years. That is essentially what we have done with the Ph.D. as expected time-to-degree became more and more vague, and demands for achievement multiplied

Career Goals

When graduates of the six programs in the Maresi Nerad and Joseph Cerny's Ten Years Later study were asked how their doctoral programs could have been improved, they pointed to "the need for greater educational relevance to he changing world inside and outside academia and better labor market preparation.[149] When well-known professors were asked as part of the Carnegie initiative to write essays on the doctorate, the majority "lament[ed] that doctoral training is poorly aligned with the careers actually available to a large number—in some instances the majority—of those who earn the Ph.D."[150] Mathematician Tony Chang spoke most bluntly: "We must recognize the fact that most of our 'products' will not become professors in research universities, so we must train them in a way that better prepares them for a broad range of career options" rather than initiating them into "an esoteric priesthood for the few."[151]

These ideas are not new. In fact, Elaine Showalter of Princeton devoted her 1998 MLA presidency to the issue of non-professorial employment, but she met such resistance that the issue was effectively tabled by the organization for well over a decade. The call for a more professionally apt Ph.D. is no longer hard to hear. The growing interest in alternative careers is travelling through all of the arts and sciences. The recent initiatives in career diversity by the American Historical Association and the Modern Language Association find their match in a science-oriented 2012 National Research Council report, *Research Universities and the Future of America.* It recommends that institutions "restructure doctoral education to enhance pathways for talented undergraduates, improve completion rates, shorten time-to-degree, and strengthen the preparation of graduates for careers both in and beyond the academy." Student organizations have joined in as well. The history students at Columbia University, for example, organized their own conference on non-academic careers even before the AHA effort at Columbia was fully underway.

This is not to deny that half or more of all doctoral students in the arts and sciences desire a professorial career. Preparation for an academic career should remain a chief business of the Ph.D. But Golde and Dore also note that more than a third of all students (35.4 percent) reported that their interest in an academic career declined in the course of their program, a remarkable finding given the conscious and often unconscious push by their advisors toward academia. Year after year, the National Science Foundation survey shows that a bit less than half of all newly minted Ph.D graduates throughout the arts and sciences take their first jobs in academia, and only a sliver of those in research universities.

But even if we accept the highest figures of eventual professorial employment, what of the 40 percent even in the most academically-oriented fields who do not become professors? Surely they matter. The Re-envisioning team reported that "students today proceed through their programs with far more varied career goals than many of their predecessors. Furthermore, they want their mentors to value and respect these goals."

The challenge, then, is not to substitute a non-academic career goal for a professorial one, but to provide a means of accommodating both. Graduate programs have always shown themselves better at adding requirements to their programs than trimming them. Following this logic, there

is a clear tension between adding preparation for alternative career paths and reducing time to degree (which we consider in more detail above)—and this translates into a curricular and administrative challenge.

But is this not a matter for our Practices section rather than our Policy category? We noted earlier that most of these issues involve both policy and practice, but that is especially the case here, and so we end the Policy section with the Career issue as a bridge to practices. We consider this issue from the perspective of policy first because a more realistic understanding of outcomes is essential for coherent assessment of graduate programs. Administrators persist in judging graduate departments by how many of their students get become professors, especially at prestigious institutions. In fact the standard should be far broader. Crispin Taylor writes, "let us consider defining success for the newly minted Ph.D. as acquiring a rewarding position that offers legitimate opportunities for professional advancement, whether or not that job happens to be in academia."[152]

How a program considers its varied forms of practice also requires a sense of the goal of professional outcomes, though that can never be the sole determinant (because disciplines involve knowledge and methods of inquiry regardless). If, against so much evidence, replenishing the professoriate remains the sole aim of a program, then the waste of human and financial resources is intolerable by even the most generous (or gullible) standard.

This is to suggest, then, that the call for programs to reduce their admissions to a level that would replace retiring professors and no more—which is heard from both conservatives and revolutionaries—is not necessarily the right fix, for it retains a narrow notion of the Ph.D. One study suggests that "rather than reducing the number of Ph.D.'s produced, doctoral programs may want to focus on the kinds of skills developed during doctoral education and career guidance given to doctoral students."[153] Strategically broadening program goals and practices may be far more to the human point and the social good.

It is true that different disciplines have more and less obvious non-academic applications. The sciences have always been hired inside and outside the academy. Likewise, it may be more obvious how an historian or a language Ph.D. might work for a government agency or a cultural institution or an apt for-profit than how a student of literature might do so. Yet the Carnegie initiative leaders note the significant contributions of English doctorate holders "to the publishing industry, writing and editing professions, government and non-profit agencies, and secondary teaching" (*Envisioning,* p. 351), to which we can add technology and media of all kinds. Similarly, in 2011, Anthony Grafton and Jim Grossman, as president and executive director of the American Historical Association, drew wide attention by insisting that many history graduates will not obtain tenure-track positions and that it is time to stop pretending otherwise. Instead, "A Ph.D. in history opens a broad range of doors."[154] That essay led to the AHA career diversity initiative described earlier.

Graduate students have many highly transferable skills—the capacity to engage in major research and bring it to term, to think both critically and creatively, to write well, speak well, and teach, this last a constant in all work environments, not in classrooms alone.

Of course, for a doctoral graduate in any field to become creative about her career opportunities, she must first comprehend that her abilities *are* versatile and offer a range of application. That is where the practices of programs can come into play. There has been fitful but increasing activity as well on individual campuses in terms of programs that engage graduate students in work beyond the academy. Perhaps the most ambitious of these, the Intellectual Entrepreneurship program across all disciplines at the University of Texas, has since shifted to the undergraduate level but still serves as an example. Arizona State University, as part of its participation in the Responsive Ph.D. effort, created a series of Career Goal-setting Workshops wherein ten students at a time (with humanities and social science students in one group and scientists in the other) met with faculty members from the Psychology department to assess their values, interests, and work styles, consider desirable professional fields, and develop a career action plan. At the University of Colorado-Boulder, an Internship program run out of the Center for Arts and Humanities places humanities students into internships outside the academy where they can transfer academic skills and knowledge to new settings. It has now expanded by leaguing with Career Services to offer internships to graduate students throughout the arts and sciences. The receiving entity must provide reasonable compensation and meaningful tasks.

Humanities Unbound, the Scholarly Communication Institute's survey of former graduate students who are working outside of academia, is helpful reading for program leaders who wish to broaden the perspective of the Ph.D. Even more so is the Institute's website called "Who We Are" in which graduates list their names, employers, and job titles. These efforts, as well as the recent initiatives at the American Historical Association and the Modern Language Association, suggest an unprecedented interest in redefining the doctorate and opening up a closed economy.

We note the absence of similar programs in the sciences, though in some scientific fields a tradition of non-academic careers may make new initiatives less crucial. We also are aware that few institutions offer to substitute non-academic internships—including some that could be available on campus —for a TA-ship.

But what is most necessary is a continuing alliance among the individual departments, the career office, and the alumni relations office. Faculty members cannot be expected to become experts on non-academic career possibilities (which is why some reliance on a career office is essential), but they can be expected to examine the message that they send their students, since graduate students, faculty members, and deans tend to blame each other for promulgating a bias against non-academic employment. Departmental and extra-departmental structures are essential.

Finally we should note that it takes two to open that wider range of opportunities. It is not simply or even chiefly the faculty who need to be persuaded but the employers as well—and not all employers are ready to hire PhDs. The Woodrow Wilson experience shows that this can be changed—offices of career services can use their contacts to promote PhDs to employers in the marketplace—but this change will require energy and persistence by people within the university working together.

PRACTICES

Advising and Departmental Culture

When graduate faculty are asked about their advising of students, they tend to spotlight their work on dissertations. But advising actually comprises, or should comprise, all of the interchange between faculty and students from orientation onward to graduation. Graduate advising tends to be under-rationalized, even at the dissertation stage.

Those who would reform advising make recommendations similar to each other. Students need clarity about the education they are embarking upon and the outcomes that await them. Professional development discussions should be held throughout the graduate years. The Carnegie leaders emphasize intentionality, "making visible and explicit those aspects of scholarly and professional expertise that are typically taken for granted and thus unarticulated."[155] Advising also gets personal. David Damrosch, a humanist, writes that, "The heart of Ph.D. training is the relationship between mentors and students."[156] Bender is among a number of commentators who observe that the "master" and "apprentice" model (which "implies a work of replication") "needs ventilating."

One way to encourage more student self-determination (Cassuto calls this becoming the CEO of one's own career) is by providing "a plurality of advisers at all stages."[157] Students benefit from having many mentors in all rather than one. One prime example: Boston University's neuroscience department, at the time of the Carnegie initiative, provided a "full circle" of mentors. Each incoming student was assigned a faculty member and an older student, with postdocs and alumni joining the group during the later years of the student's education. Each of the three additional advisors reflects a special interest in the student's post-graduation career.

Even so, there will emerge a central advisor, especially for the dissertation. But here too, programs could become more intentional and student-centered. In the sciences, research rotations allow for a kind of consumer shopping for this crucial relationship. Successful models make the activity more regular and explicit: a subject for discussion, reflection, and individual and group policy. A more formal structure—Angelica Stacy recommends as "a guide on mentoring students at various stages of research, helping plan what experiences they should be given and in what sequence"—so that faculty members comprehend and value their responsibilities more fully in this important function is eminently achievable.[158]

Such a guide would give structure to advisement in the humanities and humanistic social sciences, where there can be too little supervision, and not enough checkpoints or intermediate goals within the process. Among the few current models for this practice is Duke, which provides resources on mentorship to faculty.[159] Their website has some self-help advice for mentors and a reading list—but these materials are only available to those who seek them out.

Here we must note a basic difference between the bench sciences and other disciplines. In these fields, a faculty member with a grant funds PhD students in a laboratory where the students' work must further the faculty member's research program. In this situation supervision becomes all-encompassing, leading chemist Angelica Stacy to describe advising as "really about power."[160]   There have been modest efforts to date to make advising in the sciences more

flexible and student-centered. The National Institutes of Health called for the creation of Individual Development Plans (IDP) for all NIH-supported grad students and researchers. These plans provide a formal structure for the mentoring process.[161] Iowa State currently provides a framework for students to create an IDP. The framework guides students through a self-assessment in which they reflect on their goals and accomplishments and then to develop a plan with their mentor.[162] Brown provides a similar framework.[163]

Given that advisement is inexpensive compared to some of practices described in this report, we suggest that it be given more formal expression. For example, The University of Tennessee, Knoxville operates the Office of Graduate Training and Mentorship with workshops on mentoring.[164] The Office provides faculty training workshops and workshops for compliance with various research regulations.

Cassuto observes that faculty members are role models all the time, for better and worse, and the department culture provides the role model for advisers. That culture, George Walker, reminds us, includes "the relationships among graduate students themselves."[165] One historian told a Carnegie survey that "Intellectual community is the most important facet of any doctoral community. Students need a supportive community among themselves and collegial relations with faculty."[166] That support needs to extend to their socialization into the discipline, and also to presenting to them the diverse options they have as professionals. Put simply, departments—and their faculty—need to advise students as human beings, not larval professors.

Curricular Coherence and Scope

It is a challenge to create a graduate curriculum that meets students' needs. Practical concerns ought to reign: students need to learn their field and prepare for their qualifying examinations. In the sciences and social sciences, that this has not not generally proved a problem, but the humanities are a different story.

Battered by generations of arguments about canons and methodologies, many humanities disciplines no longer harbor a consensus about what constitutes core knowledge, and there is consequently little agreement about what a PhD candidate should know. "If you really want the students to take their general exams, and soon," says Russell Berman, a former president of MLA and professor of German at Stanford, "then offer them the courses that prepare them for it." But humanists do not all agree about what those courses ought to be—and consequently, professors default to hyper specialized seminar courses.

Disputes about the nature of a field are themselves important for graduate faculty to confront and for graduate students to engage with. But while graduate coursework is bounded by necessities, it is worsened by the lack of a faculty community that might discuss teaching methods and a coherent set of course offerings. The cross-talk that informs undergraduate instruction becomes rare at the graduate level.

Such talk is all the more necessary if curriculum is to give graduate students exposure to diverse career possibilities and the opportunity to pursue them. Programs may need to rethink course requirements, comprehensive exams, and the dissertation to accommodate more efficacious professionalization—including summer support and the substitution of some non-teaching

internships for teaching assistantships—perhaps including work in campus offices of publications, admissions, development, student services, or grant-writing.

Most graduate faculty cannot take time to become educational theorists or cognitive scientists, but they can as a community learn about the way students learn. By learning about learning, not only can programs improve their curricula but they can model anew for their students the full meaning of scholar-teacher. That balance does not now exist in doctoral education. The application of cognitive science to the disciplines is in a beginning stage, but it holds some promise as a way to approach these problems.[167]

Less formally, graduate faculty need to think about how their students learn and what they need to learn—and then they need to plan their offerings accordingly. Graduate students face difficult choices—and their professors need to teach them with their futures in mind. Put simply, graduate education needs to become more student-centered—if for no other reason than it is about educating students.

Curricular planning can benefit as well by moving beyond the boundaries of individual programs. Multidisciplinary offerings may provide students with a greater range of course opportunities than any single program can provide. The President's Council of Advisors on Science and Technology recently called on universities "to go beyond training within traditional disciplines and to institute or expand the scope of project-based, multidisciplinary learning."[168] The sciences have adapted readily in the sense that many young scientists work across field boundaries, but this adaptation remains within their grant-fueled organizational scheme, especially as funding has become scarcer.

The non-science disciplines also have become far more amenable to breaking down disciplinary boundaries. Historians of education like Douglas Bennett note a drive toward the interdisciplinary and an accompanying interest in collaborative learning as two of the major trends in the last few decades.[169] Here, doctoral education is playing catch-up. Unsurprisingly, Golde and Dore note that six out of ten graduate students in their 2001 survey desired collaboration across disciplinary lines but only 27 percent of respondents believed that they were afforded that opportunity or prepared for the possibility.[170] Nowhere is this clearer than in the academic job market in the humanities and humanistic social sciences, which is still organized around disciplines and subfields. The disjunction between interdisciplinary inquiry and traditional job categories has vexed these fields for generations. Unless we change the way we hire, such change will always be hindered.

The counterargument, of course, is that breadth sacrifices depth. But when we advocate for breadth, we also raise the practical concern of time to degree. If we are to preserve depth and add breadth, are we not adding more years to a degree process that already borders on the interminable? While there are no easy answers here, requiring of every student at least one collaborative effort across disciplinary lines would seem a reasonable means for ensuring a more cosmopolitan mindset—and for ensuring that those who stay in academia and who will be entrusted with undergraduate education will honor the ideal of breadth, of intellectual versatility.

Current models of interdisciplinarity in doctoral education do not much challenge the organization of the university or of knowledge itself, but they do usefully remind students of a wider intellectual world than a single discipline can provide. Among many such examples, the University of Michigan May Seminars bring together students and faculty on a common theme that crosses the disciplines. At Washington University in St. Louis dissertating students meet through the summer on a multidisciplinary basis. The Intellectual Entrepreneurship teams at the University of Texas were almost always drawn from several disciplines, and this remains true in the current undergraduate program there. Duke encourages students to take courses toward a cognate Master's degree at no additional charge, and Brown has recently inaugurated a program that sponsors students to do the same.[171] Arizona State, as part of the Responsive Ph.D. initiative, began to offer special fellowships to students attempting interdisciplinary dissertations,[172] and certainly financial support is one requisite for transdisciplinary encouragement. In the sciences, a private foundation, The Howard Hughes Medical Institute provided initial funding with the National Science Foundation offering sustaining public funds for a Biomedical Imaging and Bioengineering Interdisciplinary Graduate Research Training Program, a private/public partnership designed to achieve ends neither could do alone. The program, which might serve as a model for private/public partnerships, has funded a number of ventures, including a program at Brandeis in quantitative biology linking physical and biomedical sciences; another at Johns Hopkins in nanotechnology for biology and medicine; a program at the University of Pennsylvania in clinical imaging and informational sciences, and a program in biophysical dynamics and self-organization at the University of Chicago.

In truth, the most practical and far-reaching organizational change that can accommodate the transdisciplinary mode--and student--is the graduate school as a more dynamic and autonomous and better financed body in a university, a case we make more fully in our final section.

The Qualifying Exam and Alternatives

The notion that any graduate student should possess broad knowledge of the discipline seems fully sensible. And the qualifying exam serves as a quality check as well, to ensure that those students who are unprepared for the dissertation can save some years of frustration. At the same time, the exam should help to equip those who will continue with foundational knowledge and skills. Earlier attrition and academic breadth appear well-served by the system of qualifying exams.

Yet the comprehensive exam sometimes delays progress toward the degree, especially in the humanities and humanistic social sciences, as students cram in order to "cover" their fields. And this coverage model, as William James so long ago noted, may well "divert the attention of aspiring youth from direct dealings with truth to the passing of examinations." A century later, the Carnegie leaders acknowledged that "The educational purpose of the exam is often unclear to students."[173]

Many biology programs now require students to develop and defend a research project of their own invention as part of their advancement to doctoral candidacy. Cassuto suggests that the

humanities emulate this model and replace coverage-based exams with task-based examinations that look toward the dissertation to come. In this way, the exam plants the seeds for dissertation work rather serving as a barrier that separates the student from it.

Integrating preliminary work on the dissertation into the qualifying examination is becoming more common in the humanities. An interdisciplinary research paper at the American Studies department at the University of Maryland, an exam based on the student's reading list for the dissertation in English at the University of West Virginia, an early written exam followed by a research paper of publishable quality and an exam in three fields related to the proposed dissertation for the American Studies program at St. Louis University.[174]

Worthy of consideration is the substitution of a portfolio for an exam. In the history department at the University of Kansas, the "data-dump exam" stalled students so badly, often for two and a half years, that the faculty decided to substitute the professional portfolio, "a collection of artifacts designed to help students document their own histories as emerging scholars"[175]—a cv, all seminar papers, any published works, "a 15-20 page professional essay explaining why the student selected his major fields, how those fields might be integrated and related to one another, and what he understands to be the leading research issues," a dissertation prospectus and materials about teaching.[176] The Carnegie team notes that such a substitution provides on-going self-assessment, gives the student greater, responsibility and control, develops documentation habits relevant to any historian, and creates "habits of mind that will stand graduates in good stead in their future workplaces." This set of attributes might serve well as the goal for the exam in any program in any discipline.

Scholarship and The Dissertation

For most PhD students and their professors, the dissertation is the central and definitive part of the doctoral program. The notion of a capstone scholarly experience in which the student most fully joins the conversation in her discipline with her own voice can be the exciting introduction to the next stage of professional life. But the dissertation may also become the most perplexing of mazes, or an alienated and routine set of chores. In *The Assessment of Doctoral Education* (2006) by Jeannie Brown Leonard records a sense of student confusion about dissertation expectations, a sense that the adviser doesn't care very much, or that the different members of a dissertation committee are offering contradictory advice.

We have noted the disciplinary difference between the over determining life of the laboratory for apprentice scientists, and the laissez-faire advising that can go on in the humanities.   In the sciences, we noted, every major report over the last two decades has called for more training grants in order to provide a graduate experience that prioritizes the student's development. Instead, the research grant-driven system persists. Lab leaders carve off projects from their own agendas, as biologist Crispin Taylor puts it. As a result, "students may lack intellectual engagement with their project, and it may take them longer to develop the facility for independent, strategic, and constructively critical thought that is a vital component of any doctoral program worth its salt" even while "being handed a thesis project on a plate" can

shorten time to degree. Science historian Yehuda Elkana says that "defining a problem and locating the problem on the larger map of one's field" is 'the single most significant and pivotal process in science training"—but current practice makes the student "a minor technician in a huge machinery." It is, he says, "the opposite of being trained for intellectual risk-taking."[177]

This is damning critique indeed—and it comes from scientists themselves. At minimum, science educators should consider Angelica Taylor's suggestion that a portion of the student's dissertation be designed for breadth: "one section focused on something other than the student's portion of the adviser's research."[178]

Taylor also points to the other extreme in the humanities and social sciences in which greater independence with little guidance "can leave Ph.D. students feeling rudderless and frustrated," which may also increase time to degree. Between this Scylla and Charybdis Taylor sensibly calls for a middle way that will be "more valuable to the student."[179] Certainly individual directors of dissertations should set intermediate deadlines, provide continual feedback, and help their students develop skills that will serve them in their professional lives.

Beyond the conduct of the individual faculty advisor, programs can structure some aids. The University of Pennsylvania has offered a "Navigating the Dissertation" series of late afternoon, two-hour meetings, with faculty, students, and staff offering advice across the range of disciplines. The program was so well-attended that online registration became necessary.[180] Many universities operate dissertation support groups; notably, the Center for the Study of Sexual Culture at Berkeley holds a two-day dissertation retreat in Sonoma, run by 3-4 for faculty, for 8-12 students to receive feedback on their projects.[181]

The University of Colorado at Boulder recommended to all of its programs that they create discipline-specific booklets outlining dissertation expectations, that they use examples or case studies, place emphasis on the importance of two-way communication so that the student can ask for clarification as needed, and reprint the Lovitts template on what makes an excellent, very good, down to poor dissertation.[182]

These important steps nevertheless leave unquestioned the assumed nature of the dissertation itself. Menand argues that "if every graduate student were required to publish a single peer-reviewed article instead of writing a thesis, the net result would probably be a plus for scholarship" and of course they would finish much faster.[183] Cassuto argues in a similar vein that the implied requirement that the dissertation become the draft of a publishable book—as is the case in some humanities fields—is "a costly and misguided mistake" that has added a time-consuming burden to the degree, in effect transferring an assistant professor's publishing requirements to graduate students, many of whom will never become professors.

Alternatives are starting to show themselves. Idaho State, for example, requires students in English to include a chapter on the implications of their research for teaching" as the great majority of their graduates who go into academia will find positions at teaching-centered colleges. And at the University of Colorado, the German and Slavic Department has initiated a four-year Ph.D. designed with diverse career possibilities in mind, with the third year devoted to research and the fourth to completing the dissertation. A Stanford University group that

authored a 2012 working paper called "The Future of the Humanities Ph.D." suggests that students be admitted in one group and then encouraged to customize their courses of study based on their career goals after the second year. They then would configure the dissertation according to those goals, in a format—such as a suite of essays—that would best suit them. Russell Berman of Stanford, who headed the group that produced that paper, also led the 2014 MLA Task Force on Doctoral Study in Modern Language and Literature. Their report recommends an "expanded repertoire" for the dissertation including "Web-based projects that give evidence of extensive research, translations, with accompanying theoretical and critical reflection; public humanities projects that include collaboration with people in other cultural institutions and contain an explicit dimension of research; and the treatment of texts in terms of their pedagogical value in classrooms."[184]

But to this date innovations that affect the dissertation are few and far between. Stanford's working paper has led to no new policies, for example, and the traditional dissertation remains largely undisputed in practice. The dangers that accompany this conservatism are myriad. Time to degree remains unethically high, and students complete the same kind of dissertation regardless of their goals. Nor should we overlook the sense of intellectual conformity that accompanies this reflexive adherence to tradition. In these times we can ill afford an intellectual mandarinism that conveys such scant reward.

Pedagogical Training

Not all doctoral students will become professors, but in a broad sense all will teach. Academics have long believed that scholarly training is beneficial for all graduate students regardless of career choice. So too for teaching. Every graduate student should become an effective teacher, or at least advance on the way to that goal.

Here again, reality seems at war with an ideal. In the sciences, those who choose to teach do so with the knowledge that it carries low status.

Outside of the sciences, where more students teach, graduate students are mainly assigned to whatever courses the tenure-track faculty does not wish to teach. They may be well-trained to instruct in courses like introductory composition, language instruction, calculus, or introductions to the disciplines. This practice is unthoughtful of doctoral students and leads in turn to hit-and-miss pedagogy for undergraduates, as typically the least experienced teachers work with the least experienced students. At many state universities, this arrangement has become essential to the bottom line. Such an instructional strategy is a poor advertisement for academia, and no way to prepare the next generation of scholar-teachers—or the next generation of anything else, for that matter.

This hierarchical system enshrines ancient assumptions that professors rarely question. The phrase "teaching load," for example, expresses an entire attitude. As mathematician Hyman Bass notes, one does not say "research burden."[185] Finances and faculty privilege have everything to do with a system that no student-focused ethic would permit. Perhaps doctoral

education's lack of intentional structure in this regard helped to spur the reform efforts of the 1990's and 2000's, but even if that is true, these reforms did not address those key issues. There is a growing sense today that they need confronting.

This is an issue where much progress has been made over the last two decades, but because the changes began from an alarmingly low point, much remains to be done, for. In Golde and Dore's 1999 student survey, more than four in ten students felt unprepared to teach discussion sections, while 55 percent of science students felt unprepared to teach lab sections, and nearly two-thirds of all students felt unprepared to lecture.[186] In the following year, the National Doctoral Program Survey found similarly that "students were concerned about not being adequately prepared and trained to fulfill their roles as teachers."[187]

The Carnegie Fund for the Advancement of Teaching skewered the privacy that paradoxically surrounds the quintessentially public act of teaching,[188] noting in 2004 that "Habits and conversations that would allow faculty to share what they know and do as teachers, and to build on the work of other teachers, are almost nonexistent. In this respect, "The contrast with research is striking."[189] It is clear that programs need to promote more exchange of information by faculty—amongst themselves and with students—about teaching.

The Preparing Future Faculty initiative arose because most students had not been exposed to anything like the range of institutions where the great majority of them would be employed. The PFF recommendation for programs to prepare their students "to teach students with different abilities and motivations" makes much sense, and for those who will seek extra-academic employment, the same need holds, and may be greater. Given the change in the professoriate whereby the largest job growth is in teaching-centered academic positions and the fastest growing student population attends community colleges, the importance for doctoral students to experience a range of institutions first-hand is greater than ever. This experience should include actual teaching assignments.

Our awareness of the changing nature of faculty positions needs to broaden, and collaborations between research-centered and teaching-centered institutions is an excellent way to achieve this understanding and to enact it at the same time. Some such efforts have been initiated just recently. Stanford University, for example, has forged a partnership with nearby San Jose State University that brings Stanford graduate students into the SJSU workplace. Stanford calls this program, "Preparing Future Professors."[190] Similarly, the Mellon Foundation recently funded a four-year pilot program that will bring graduate students and the CUNY Graduate Center into classrooms at LaGuardia Community College.[191]

But of course the effort in teacher training lengthens time to degree—unless it does not. The Mellon report found that while six semesters or more of teaching slowed progress to the degree, the results varied for those who taught for fewer semesters. Pertinently, those who never taught "were less likely to graduate than those who did." And the Mellon researchers note that teaching assistants actually gain "benefits that fellowship recipients do not necessarily enjoy—including the opportunities to confer with faculty members and other graduate students and relevant preparation for later teaching careers."[192] Indeed, we know now that a great many colleges and

teaching-intensive universities will reject applicants who lack relevant teaching experience. This all suggests that a well-designed progression of three or four semesters of teaching may be ideal in providing a significant introduction to becoming an educator without retarding the completion of the degree.

The movement to focus more of the doctorate on teaching began with Ernest Boyer's *Scholarship Reconsidered* (1990), in which he considered teaching as a form of scholarship and urged that it should be respected as such. Critics considered Boyer's widened definition of scholarship a rationalization for non-publishing faculty members, but his work nonetheless refocused some attention on pedagogy. Boyer's successor as director of the Carnegie Fund for the Advancement of Teaching, Lee Shulman, established the CASTL (Carnegie Academy of Teaching and Learning) initiative in 1998 in partnership with the American Association of Colleges and Universities to support campuses interested in "scholarly approaches to teaching and learning."

This initiative had some salutary ground-level effects. Indiana University urged faculty to include their research on teaching and learning activities in their annual report forms. This move, not only at Indiana but elsewhere, was linked carefully and thoroughly to graduate students via the Preparing Future Faculty initiative. Indiana's sociology department, for instance, required graduate students to take a three-course sequence on teaching and learning, with the third course consisting of a research project. At Howard, faculty-student pairs applied for small grants on teaching and learning and presented their findings in a public roundtable. (In the first round, for instance, nine programs considered how undergraduates acquire the language of their disciplines.) At Michigan, an innovative program in Chemistry employed training grants to design, implement, and assess an instructional project. And at Colorado, students taking a number of workshops on teaching received a certificate, and lead teaching assistants were provided with small stipends to organize teaching activities in departments.[193] At Stanford, graduate students and faculty are team-teaching undergraduate courses.[194] Other examples are mentioned in part one of our report, in the descriptions of the Preparing Future Faculty and the Responsive Ph.D. initiatives.

A formal practice worth noting is the "Scholar-Educator Option" offered by the Ph.D. program at the School of Biological Sciences at Illinois State University. This track combines research experience with formal training in teaching.[195] The University of Missouri offers a teaching certification of sorts in the form of a Graduate Minor in College Teaching available to all graduate students. It requires 9 credit hours, including a 3-hour core course, a teaching practicum, plus 3-6 elective hours.[196] The University of Illinois at Chicago offers a similar certification. More broadly, the University of Washington has instituted "Lead TA" positions for veteran Teaching Assistants selected to assist and mentor new TAs.[197] While we value these initiatives, we also note that the practice of specifically certifying graduate students to teach indicates the extent to which that skill is not normally valued in their education already

In the STEM fields, the Mathematical Association of America runs Project NExT which gives teaching instruction to new and recent PhDs (along with other services).[198] In science, an ambitious response on a national scale to the need for graduate students to learn about teaching

and learning is the Center for the Integration of Research, Teaching and Learning (CIRTL). The program, started in 2003, was funded by NSF and is hosted by the Wisconsin Center for Education Research. It aims to advance undergraduate education by improving the teaching skills of STEM graduate students. The center today consists of a network of 23 research universities, serving over 4000 students each year, and is soon to expand to serving fifty universities. CIRTL has produced over 100 useful publications and provides notes from hundreds of network presentations, which began in 1997.[199] In Fall 2015, for example, the center is offering online courses covering such issues as Teaching with Technology, Developing a Teaching Portfolio, Diversity in the College Classroom, Teaching the STEM undergraduate, Introduction to Pedagogy and Practice, and, in partnership[with the AAAS, Students Reading Real Science: Bringing Primary Literature in to the Undergraduate Classroom. The courses include asynchronous activities and synchronous class meetings. In addition, four main foci— Learning through Diversity, Effective Use of Technology, Teaching as Research, and The Academic Career, serve to organize online learning communities.

This model, adaptable to non-science disciplines as well, offers a means for individual programs to supplement their training in teaching in a concrete way. It serves as a powerful tool now, but its greatest import may be as a model.

Part Three: Lessons and Prospects

Cultural change is always difficult, and it has proven particularly so in higher education. There is a developing consensus to view the arts and sciences doctorate less exclusively as a means of replenishing of the university faculty. Instead, we are emphasizing a change in the doctorate from an unrealistic vocational degree to an intellectual degree with diverse applications in a variety of social sectors. Yet as we review the efforts to improve the Ph.D. in the arts and sciences over the last quarter century, one impression is inescapable: the disproportion between the extraordinary amount of reform initiatives and research reports and the disappointing outcome in terms of actual improvements. Most of the habits and traditions of doctoral study persist, with the result, in the words of Derek Bok, that "graduate schools are among the most poorly administered and badly designed of all the advanced degree programs in the university. Doctoral programs, Bok writes, are "woefully out of alignment with the career opportunities available to graduates."[200]

That misalignment is pervasively destructive. The Carnegie researchers report that the "passionate zeal" of students is "unnecessarily eroded," and that doctoral study amounts to a "waste of human talent and energy in activities whose purpose is poorly understood." They call this waste "an urgent matter,"[201], but somewhere between thinking and acting, the urgency gets lost. The Carnegie leaders themselves describe the results of their strenuous efforts as modest, often simply accelerating reforms already underway, just as the abundantly-funded Mellon initiative found itself dependent upon the willing, who turned out to be few. Our colleague Jim Grossman, who directs the American Historical Association, has noted recently that each stake-holding group in doctoral education—faculty, students, administrators—wants to change habitual practices but cites recalcitrance on the part of the other two as a reason why nothing can be done.

Grossman's comment highlights an important point: lots of people want the system to change, but no one person or group believes that it is tasked with changing it. In other words, we are seeing a lack of assigned and accepted responsibility. That lack of responsibility will be the focus of our concluding assessment.

With Grossman's observation in mind, let us consider a series of statement by the astute scholar Kenneth Prewitt, who reviewed the essays on the Carnegie initiative a decade ago. Those essays, says Prewitt, "are bold in the reforms recommended. But they are timid, in fact mostly silent, about who will have to align institutional habits, budgets, rules, and incentives if the reforms are to move from pages in this volume to practices in research universities."[202] In other words, it's easy to talk about what is to be done, but quite another thing to identify who is to do it.

Graduate students appear to agree. In the extensive 2000 survey, they make a pointed recommendation that is still more valid today: "Instead of brainstorming about what should happen, those involved in enriching graduate education should take well-considered suggestions that have already been made and turn those ideas into reality.[203] Fifteen years later, those

demands for actual change on the ground are even more insistent.—and in light of the worsened academic job market, even more justified.

Given the passion and intelligence that has been expended and the number of dollars spent to encourage innovations in doctoral education, it is clear that the central barricade in the way of action is structural. We therefore make two major recommendations based on our survey of past and present reforms. One is to rethink the nature of the graduate school and empower the graduate deanship to create an effective voice of the student and potent agent of institutional change. The other is to create incentives for change at every level—from students to departments and their chairs to provosts to presidents to foundation and disciplinary leaders, with an eye to government as well. If the graduate school and dean become the central conduit for all of these activities, the two goals become linked.

Prewitt says that "the genius of doctoral training in American higher education is that *no one is in charge,*" yet that this lack of administrative oversight is equally a disaster: "That no one is in charge cannot be taken to mean that no one above the faculty level has responsibilities." Prewitt describes a field of responsibility without top-down leadership to assign that responsibility. Seen from this angle, it is not difficult to understand why so much inertia impedes change in doctoral education in America. In higher education, says Prewitt, "goals and incentives are misaligned" and this, he writes, constitutes "a leadership failure."[204]

That leadership failure is more like a vacuum. Consider that in calling upon presidents, provosts, and foundation leaders to re-align the incentives, Prewitt does not even mention graduate deans. That is because graduate deans rarely have the power to change their own surroundings. The graduate deanship at some institutions is subordinated to the office of research, while at some others the job simply doesn't exist, and its responsibilities are tacked on to the job descriptions of other deans or the academic vice president. In most cases, the graduate dean is a financially powerless figure who must seek alliances with the chairs and faculty deans to get anything done. "Follow the money," wrote Weisbuch in 2005, "and it leads away from the graduate school to the faculty salary budgets of the other deans."[205]

This localized governance is not entirely a bad thing. Faculty ownership of the degree can inspire extraordinary involvement. At the same time, many others have a stake in that training, including the academic institutions, the government agencies, the cultural institutions, the laboratories, the non-profits and corporations that will hire the products of the doctoral system, and, above all, the students themselves.

Moreover, the Carnegie leaders note that "just as fish take water for granted, those inside the system find it hard to see…traditions and practices clearly."[206] Problems overlooked cannot be problems solved. As Damrosch puts it, "we academics are better placed to solve the world's problems than our own."[207] Faculty members are devoted to their disciplines and care about their students but they also are, like everyone else, self-interested. Hence the defanged graduate deanship.

Yet the importance of a strong graduate deanship or a consciously conceived alternative to one was elided by the Carnegie initiative then and by recent initiatives by the MLA and AHA now.

The Mellon initiative, on the other hand, depended on the graduate deans—and the uneven results speak to the weakness of that oversight. The Responsive Ph.D. sought deliberately to strengthen the graduate dean's position by working only through that office, but it did not succeed in strengthening it. It is worth repeating their recommendation: "The central notion of a graduate school requires strengthening so that it can become a vital force in breaking down barriers between programs and sponsoring a more cosmopolitan experience for doctoral students."[208] Today we would add that the greatest barrier that graduate schools—led by their deans—should break down is the one between reform ideas that have gained a considerable consensus and the actual practices and policies of programs.

Dictatorial power is not at stake here—"Order me and I will fight you to the death," one faculty member noted at a Woodrow Wilson forum. "Invite my expertise and there is nothing I won't do for you." This sentiment argues for more carrots than sticks, and for collaboration rather than fiat, but without power the graduate dean cannot act. The dean of the graduate school requires a sizable independent budget to encourage innovation, reward improvement, and, occasionally, withhold funds from programs.

But even this authority will be meaningless without clearly stated standards and expectations for evaluating programs. Such assessment certainly should engage all interested faculty members—who then can bring back useful concepts to their own programs.

The main reason we call for a strengthened graduate dean and school, then, is that there is no one else and no other office in the university structure that can institute major reforms whose scope extends beyond single programs. A provost or research vice-president each must spend the majority of their attention on other matters. In addition, the graduate deanship can sponsor and drive transdisciplinary efforts. Collaborative and interdisciplinary preparation currently "is hostage to a reward system tailored to individual achievement within a discipline," says Prewitt.

Consequently, the most important function of a president and a provost in relation to doctoral education is to appoint a strong graduate dean and to fund a dynamic graduate school. But why should they care? And this is where we need to move to the second principle of providing motivation at every level. We will start with university leadership, because it may be the level that is most difficult to motivate.

Prestige—the "money" of higher education—motivates institutional leaders. Right now the prestige economy that surrounds graduate study is almost entirely research-based. We recommend a national website that rates (not ranks) programs and graduate schools—and which may provide a counterweight to the largely reputational surveys that now dominate the landscape. We can rate programs as they seek to achieve a limited number of goals, like these:

- **publication of attrition and time to degree statistics with a standard for each—perhaps six years and 75 percent completion**;
- **clear goals and guidelines imparted to students;**
- **a diverse student cohort that receives sufficient support;**
- **pedagogical training as a developmental set of activities that create awareness of practices at a range of institutions;**

- **expanded career opportunities**
- **explicit guidelines for advising at all stages of a program;**
- **interdisciplinary opportunities and flexible dissertation alternatives; and levels of student support)**
- **thorough data on outcomes for graduates over the last decade**

Aside from the need for a public rating of programs according to such criteria, these categories imply an agenda for foundations to reward or incentivize graduate schools and their departments in particular areas. Areas for funding could include:

- **self-assessments including student and alumni surveys;**
- **outcome data-keeping;**
- **promoting a more diverse doctoral cohort by innovative recruitment, by collaborations among academic institutions, and by funding on both a need- and racial-ethnic basis**
- **creating diverse career opportunities, adding professional development seminars, and forging links to the career and alumni offices;**
- **innovative programs to recruit, advise, and support a more diverse student cohort;**
- **non-professorial internships, including those that might take place on a campus in such areas as student services, development, publications, and university relations— or deans' offices;**
- **affording students teaching opportunities including the possibility of exposure of students to a diverse set of institutions;**
- **concrete proposals for improving rates of completion and time to degree**

That is, national funding by foundations and agencies should focus on specific issues, and set expectations. Proposals should also include a plan for permanence beyond current personnel. Further, and especially in terms of diversity efforts on a national scale, funders themselves should collaborate to create a totality of effort.

Many of the items on these lists surfaced in earlier reform efforts. It is fair to ask why they should work now—and spread to other institutions—if they did not then. They failed to do so, we believe, for three reasons. First, suasion was not strong enough, even when ongoing data collecting showed that programs were not performing according to expectations. Second, there may not have been sufficient time for faculty buy-in or sufficient means for the relatively few models to be replicated at a larger number of schools. We suggest a policy of secondary funding for later adaptors. Indeed, we recommend that in the case of national reform initiatives, half of the resources should be expended upon getting the news out and helping the ideas spread. The elaborate website and set of meetings convened by the American Historical Association to spread the word from its four departments that are integrating diverse career models into their doctoral programs may itself prove a model in this regard. But our point is that the formula of choosing a few to influence the many, while natural, requires thoughtful public relations. The choice of model programs is worth considering as well. We need to consider the selection

criteria for inclusion, to maximize the possibility that the few will become the many and the many become the norm.

And finally, many previous initiatives did not co-ordinate their efforts with each other, and this remains the case among funders seeking to attract more students from under-represented groups to doctoral study. Coalitions are especially important in this effort but they are vital to every challenge to make doctoral education more valuable for its students.

Though the internet is no panacea, technology provides new opportunities to disseminate reform and coordinate efforts. Indeed, this very report is being translated to a website, and it is our hope that our compilation of improved practices will become ongoing. Programs always must contour any innovation to fit their own distinctive character, but we have spent too long inventing the wheel in the private space of our own garages. There has been too much redundancy and too little publicity. We need to do better.

Foundations, disciplinary associations, and other umbrella organizations have three other roles:

1) To seek to influence public policy. If every major report on the doctoral sciences has recommended a greater percentage of training grants at the expense of research grants, such major funders as NSF and NIH need to take notice. Not to do so results in funding immediate needs at the expense of the long term.

2) To provide economic advice. Reforms usually bear a cost, and proposals could be reviewed by a panel offering early advice on how to make innovations cost-effective.

3) To use their convening power. It is crucial for faculty members and doctoral students to know what the leadership considers to be good policy and practice.

We have suggested that the power of the purse may be used to encourage individual departments and programs. How should they start? One possibility is the kind of survey of alumni (including non-completers) and current students that was conducted in English at Columbia under the auspices of the Carnegie initiative. Another is too ask the three questions--whether there is a will for reform, who can get it done, and by what means -- raised by the leaders of that initiative. Another way to begin is to educate the faculty by having them read about the major issues and their history. Faculty idealism is a potential lever to create change, but has not been fully engaged in support of doctoral education.

If prestige is comparable to money, so is money—which is to say, money matters, especially as a sign to faculty members of an institution's values. It matters most crucially, of course, to students, who also require some incentives to be more self-aware and creative as they consider their career prospects, and whether a program fits their talents and temperaments. Workshops are good, but credited courses are better, and credentials (such as certificates) better still. The strengthened graduate school should solicit graduate students' own ideas.

Mellon has produced this report because the initiatives of the past are themselves an education for the future: too much human effort and money have been expended over the past generation to improve doctoral education for the results to be forgotten. We need to learn from what worked,

and also from what did not.   The study of past work also suggests revisions to new efforts. Much that was done in the past generation can inform the work of this one. We have already noted the exemplary nature of the Carnegie initiative's three basic questions for program self-assessment. Preparing Future Faculty coalitions provide an excellent model for broadening students' teaching experiences. Similarly, Woodrow Wilson's summer fellowships for internship work beyond the academy and the matching of willing for-profits and non-profits with doctoral graduates was intended to be taken over by individual campuses (which have their own regional businesses, cultural organizations, and interested alumni). But these good ideas cannot be adapted if no one knows that they were tried in the first place. Doctoral study is in trouble right now, and we cannot afford to make the same mistakes when we try to fix it. Future reforms must begin with awareness of the strengths and weaknesses of past efforts.

We must also assign and take responsibility. Mathematician Tony Chan writes, "There is no shortage of ideas about *what* we need to change. We have to decide whether or not we *want* to change."[209] Literary scholar David Damrosch rightly asks, "if everybody knows what needs to be done, why are so few programs doing it?"[210] He quotes Clark Kerr's observation that what is remarkable about higher education generally "is not how much has changed but how little…in so many areas under faculty control" and that "academic reform was mostly overwhelmed by faculty conservatism."[211] Academia is surely conservative (with a small "c," meaning that it is wary of change). But graduate school is conservative even by academic standards. So little about it has changed that we might rightly describe it as rigid, not conservative.

But as Damrosch and Chang suggest, even when we want to change, we can't manage to do it. We suggest that the failure begins with responsibility: we need to bring the responsibility to change together with the power to effect change. We must change *the process by which we change* if we are to effect the reforms we need. We have a leadership vacuum that disperses academic responsibility. But we have to take on that responsibility—to the university, to our fields of study, and especially to the professional lives and futures of our doctoral students.

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NOTES

[1] CGS gives 57% as the average completion rate (49% in the humanities, and 55% in mathematics and physical sciences, 63% in the life sciences, 64% in engineering). See Robert Sowell, "Ph.D. Completion and Attrition: Analysis of Baseline Data." Council of Graduate Schools, 2008. <https://www.insidehighered.com/news/2007/12/07/doctoral> Accessed Dec. 4, 2014.

[2] William Bowen became president of the Andrew Mellon Foundation in 1988 and with Julia Ann Sosa published a book the following year projecting a severe shortage of doctorate recipients who would be qualified to teach in the nation's colleges and universities (*Prospects for Faculty in the Arts and Sciences*, Princeton UP, 1989), but this forecast did not prove out, mainly because of the widespread emergent practice of replacing many retiring tenured faculty members with low-paid, often part-time adjuncts. Meanwhile, as Bowen and Neil Rudenstein documented in a 1992 study, *In Pursuit of the Ph.D.* (Princeton UP), the time to degree for doctoral students in the humanities had swelled beyond eight years, and the rate of attrition of entering students had surpassed 50 percent—shocking data that this publication first made widely known.

[3] The first grad student union was organized in 1969 at Wisconsin; see R.G. Ehrenberg, Daniel B. Klaff, Adam T. Kezsbom, and Matthew P. Nagowski, "Collective Bargaining in American Higher Education" in Governing Academia, ed. Ronald G. Ehrenberg (Ithaca: Cornell UP, 2004), 209-32, 222.

[4] Chris M. Golde and Timothy M. Dore, *At Cross Purposes: What the Experiences of Today's Doctoral Students Reveal about Doctoral Education* (Pew, 2001), 5.

[5] George E. Walker and Chris Golde, *The Formation of Scholars* (Jossey-Bass, 2008), 19.

[6] William James, "The PhD Octopus," *Harvard Monthly*, March 1903. PG TK.

[7] Louis Menand, *The Marketplace of Ideas* (Norton, 2010) 151-2.

[8] Committee on Science, Engineering, and Public Policy, *Reshaping the Graduate Education of Scientists and Engineers* (Washington, D.C.: National Academic P, 1995), 2.

[9] COSEPUP, *Reshaping*, 5.

[10] This includes 93 percent in Math and 89 percent in English who were not in tenured academic positions. Merisi Nerad, et al., "Paths and Perceptions," in *The Assessment of Doctoral Education* (Stylus, 2001), 131-2.

[11] Ibid. 117.

[12] Yehuda Elkana, "Unmasking Uncertainties, Embracing Contradictions" in *Envisioning the Future*, ed. Walker and Golde (Jossey-Bass, 2006), 91.

[13] *The Responsive Ph.D.: Innovations in U.S. Doctoral Education* (Princeton: Woodrow Wilson National Fellowship Foundation, 2005), 19.

[14] Crispin Taylor, "Heeding the Voices of Graduate Students and Postdocs" in *Envisioning*, 50.

[15]

[16] Lemann, "The Soul of the Research University."

[17] Thomas Bender, "Expanding the Domain of History," in *Envisioning*, 295-310, 295.

[18] See NSF, "Doctorate Recipients from U.S. Universities: 2013" www.nsf.gov/statistics/sed/2013/digest/index.cfm

[19] Bender, "Expanding," 298.

[20] Harriet Zuckerman, Jeffrey A. Groen, Sharon M. Brucker, and Ronald G. Ehrenberg, *Educating Scholars: Doctoral Education in the Humanities* (Princeton UP, 2010), 3.

[21] See William G. Bowen and Neil L. Rudenstine, *In Pursuit of the Ph.D.* (Princeton UP, 1992).

[22] Zuckerman, et al., *Educating Scholars*, 5-7.

[23] Zuckerman, et al., *Educating Scholars*, 9.

[24] Zuckerman, et al., *Educating Scholars,* 258.

[25] Zuckerman, et al., *Educating Scholars,* 308, 101.

[26] The median age of PhD recipients in the study was 31, and the mean 32.5 . For those who attained tenure-track employment, the figures were 34 and 35.2. Those who graduated in 5 years or less, or in 6 years, had the highest percentage of tenure-track jobs, with the 7-year PhD's next, and the 8-year graduates after that. Publications helped these students, but far more in the record after three years than after six months, where those without publications score at 34 percent compared to those with three or more at 40 The difference grows to 35 versus 70 percent after three years but that may well be because those who published in grad school continue to do so. In all, "Having published increases a PhD's chance of getting a tenure-track position within three years of a degree. But taking as long as eight years to get the degree (or longer) has the opposite effect" (Zuckerman, et al., *Educating Scholars* 21). Here we must also consider that the programs in the study were among the best-funded in the country, meaning that students who wanted to finish with alacrity were not required to teach in order to support themselves

[27] Zuckerman, et al., *Educating Scholars,* 86.

[28] "Of those employed after three years in a tenure-track position," write the authors, "50 to 60 percent of them are at doctoral institutions, about 15-25 percent at Masters-level institutions and another 15-22 percent at liberal arts colleges" (p. 199). Here we note that this finding elides attrition, which was 43% of the sample surveyed—so the percentage of students placed at doctoral institutions by the ten high-ranked universities in the study is really more like 12 to 15 percent of the entering class.

The success rate of graduates in attaining tenure-track positions at four-year institutions immediately upon graduation, and after up to three years, actually declined from the 1990-92 cohort (35 and 57 percent respectively) to the 1998-2000 cohort (30 and 52). Those who left programs without graduating also had jobs, "a large majority of which are professional ones," which made clear "that the vast majority of them are not trapped in menial, low-level jobs and that they in fact received a payoff from their investment in doctoral education" (Zuckerman, et al., *Educating Scholars,*185).

[29] Zuckerman, et al. *Educating Scholars*, 86.

[30] Zuckerman, et al., *Educating Scholars,* 224.

[31] Zuckerman, et al., *Educating Scholars,* 248.

[32] Jerry G. Gaff, Anne S. Pruitt-Logan, Leslie B. Sims, Daniel D. Denecke, *Preparing Future Faculty in the Humanities and Social Sciences: A Guide for Change* (Washington, D.C.: Council of Graduate Schools, Association of American Colleges and Universities, 2003), 179.

[33] Gaff, et al., *Preparing*, 181.

[34] Gaff, et al., *Preparing*, 183.

[35] Zuckerman, et al., *Educating Scholars*, 154.

[36] Gaff, et al., *Preparing*, 189.

[37] Jody D. Nyquist, Bettina J. Woodford, and Diane L. Rogers, "Re-envisioning the Ph.D: A Challenge for the Twenty-First Century" in *Paths to the Professoriate: Strategies for Enriching the Preparation of Future Faculty*, ed. Ann E. Austin, Donald H. Wulff (San Francisco: Jossey-Bass, 2004), 194-216, 194.

[38] Nyquist, Woodford, Rogers, "Re-envisioning," 194.

[39] Nyquist, Woodford, Rogers, "Re-envisioning," 197.

[40] Nyquist, Woodford, Rogers, "Re-envisioning," 199-210.

[41] Nyquist and Woodford, "Re-envisioning," 13.

[42] As an interesting postmortem, when the American Historical Association began its Career Diversity initiative in 2013 (see below), it located several of the recipients of these grants. Interestingly, the majority were in academic positions and yet credited the summer internships as contributing significantly to their success.

[43] The program attracted strong applicants, but Woodrow Wilson did not have a significant endowment and no national funder was located. A few institutions did continue the program on their own for another two years, but it gradually petered out.

[44] Richard A. Cherwitz and Charlotte A. Sullivan, "Intellectual Entrepreneurship: A Vision for Graduate Education," *Change*, 34.6 (2002): 22-27, 24.

[45] Cherwitz and Sullivan, "Intellectual Entrepreneurship," 25-27.

[46] In the original group, Yale, Howard, Penn, and Princeton represented the East; Indiana, Michigan, Wisconsin, and Washington University the Midwest; Duke, Texas, and Arizona State the South and Southwest; and Irvine, Colorado, and Washington the Far West. Later, both the University of Illinois at Urbana-Champaign and at Chicago joined in, as did U.C.L.A., Kentucky, Louisville, and Vanderbilt.

[47] Robert Weisbuch, "Toward a Responsive Ph.D" in *Paths*, 217-235, 217-20.

[48] Woodrow Wilson National Fellowship Foundation, *Responsive*, 3.

[49] WWNFF, "The Responsive Ph.D.," 3.

[50] Brown Graduate School, "Graduate School to launch 'Open Graduate Programs' with $2M Mellon grant," October 5, 2011. http://www.news.brown.edu/pressreleases/2011/10/mellon.

[51] WWNFF, "The Responsive Ph.D.," 3.

[52] Walker et al., *Formation,* 32-33.

[53] Prewitt, "Who," in *Envisioning*, 23.

[54] Pat Hutchings and Susan Clarke, "The Scholarship of Teaching and Learning: Contributing to Reform in Graduate Education" in *Paths*, 161-76, 161.

[55] *Paths*, 240.

[56] Walker et al., *Formation*, 12.

[57] Walker et al., *Formation*, 45.

[58] David Damrosch, "Vectors of Change" in *Envisioning*, 34-45, 41.

[59] Walker et al., *Formation*, 46-47.

[60] Walker, "The Questions in the Back of the Book," *Envisioning*, 419-27, 426-27.

[61] For more information on the Ford awards, see http://sites.nationalacademies.org/pga/fordfellowships/

[62] For more information on the Gates Millenial Scholars Program, see https://gmsp/publicweb/AboutUs/aspx.

[63] For more on the Southern Education Regional Education Board Doctoral Scholars Program, see http://www.sreb.org/page/1074/doctoralscholars.htn

[64] For more information on the Alfred P. Sloan Foundation Minority Ph.D. Program, see http://sloanphds.org/

[65] For more on the Ronald E. McNair Post-Baccalaureate Achievement Program, see http://www2,ed,gov/programs/triomcnair/index,html

[66] For more information on the NSF Alliance, see
http://www.nsfagep.org/files/2010/02/agep.info brief viii.pdf

[67] For more information on the CGS Award for Innovation, see http:www.cgs.net.org/, and a 2003 publication, http://www.bu.edu/provost/files/2013/08/Achieving-an-Inclusive-Graduate=Community.pdf

[68] For more information on MOST, see http://asanet.org/footnotes/nov02/fn10html and http:/www.asanet.org/press/20020607.cfm

[69] For more information on IGERT, see http:rssprgm/igert/iontro.isp and http://www.nsf.gov/funding/pgm.summ.jsp?pimss.id

[70] Steven C. Wheatley of ACLS, quoted in Leonard Cassuto, "Teaching in the Postdoc Space," Chronicle of Higher Education, 17 April 2011 . http://chronicle.com/article/Teaching-in-the-Postdoc-Space/127150/

[71] For more information on the Public Fellows Program, see https://www.acls.org/programs/publicfellows/

[72] See https://www.acls.org/research/publicfellows/

[73] Email correspondence with John Paul Christy, October 22, 2015.

[74] https://www.historians.org/Documents/Many_Careers_of_History_PhDs_Final.pdf

[75] Email correspondence with James Grossman, Executive Director, American Historical Association, Nov. 8, 2015.

[76] https://connect.commons.mla.org/about-connected-academics/

[77] Posselt, *Faculty Gatekeeping in Graduate Education* (Harvard UP, forthcoming). Note also the CGS's initiative to holistically review the admissions process; see CGS, "Innovation in Graduate Admissions through Holistic Review," 2014 <http://cgsnet.org/innovation-graduate-admissions-through-holistic-review> Accessed Nov. 23, 2015.

[78] Leonard Cassuto, *The Gradaute School Mess* (Harvard UP, 2015), 17-56.

[79] Menand, *The Marketplace of Ideas*, , p. 105

[80] *Advancing Graduate Education in the Chemical Sciences*, Presidential Commission, American Chemical Society Report, 2012.

[81] Jeff Allum and Hironoa Okahana, *Graduate Enrollment and Degrees: 2004 to 2014* (CGS and ETS, 2015), 3.

[82] See for example, Chan, "A Time for Change" in *Envisioning*, 129; and Joyce Appleby, "Historians and the Doctorate in History," in *Envisioning,* 321.

[83] Colander, a professor of economics at Middlebury College, argues that graduate school ought to be presented not only as job training but also as a "luxury consumption good." Departments, he says, ought to distinguish between students who enroll in search of a job afterward and those who attend for the sheer love of the subject, a category that includes many part-time students. Colander focuses his analysis on English departments, but it's easy to generalize from his conclusions. Part-timers, he suggests, "might be organized into an 'Executive English Ph.D.' program" with "a more convenient schedule for working students, just as Executive M.B.A. programs have."   See David Colander, with Daisy Zhuo, "Where Do PhDs in English Get Jobs? An Economist's View of the English PhD Market," *Pedagogy* 15.1 (2015), 139-156.

   For more on Part-Time PhD students, see Leonard Cassuto, "The Part-Time Ph.D. Student," *The Chronicle of Higher Education*, 7 October 2013. http://chronicle.com/article/The-Part-Time-PhD-Student/142105/

[84] Zuckerman, et al., *Educating Scholars*, 7.

[85] Zuckerman, et al., *Educating Scholars*, 99.

[86] Council of Graduate Schools, *Ph.D. Completion and Attrition: Executive Summary*, 2. http://www.phdcompletion.org/information/executive_summary_demographics_book_ii.pdf

[87] Zuckerman, et al., *Educating Scholars*, 99.

[88] Barbara E. Lovitts, "Being a Good Course-Taker Is Not Enough: A Theoretical Perspective on the Transition to Independent Research," *Studies in Higher Education* 30.2 (2005): 144.

[89] Zuckerman, et al., *Educating Scholars,* 265.

[90] Barbara E. Lovitts, "Research on the Structure and Process of Graduate Education: Retaining Students" in *Paths*, 1115-36, 116.

[91] Lovitts, "Research on the Structure," 120.

[92] Lovitts, "Research on the Structure," 132-3.

[93] Bok, *Higher Education,* 247.

[94] Angelica M. Stacy, "Training Future Leaders," *Envisioning*, 187-207, 204.

[95] Sonia Sotomayor, *My Beloved World* (New York: Knopf, 2013), 180.

[96] R. Sowell, J. Allum, and H. Okahana, *Doctoral Initiative on Minority Attrition and Completion* (Washington, DC: Council of Graduate Schools, 2015).

[97] Daryl Smith, *Diversity's Promise for Higher Education, Making It Work* (Baltimore: Johns Hopkins University Press, 2nd edition, 2015), 48-56.

[98] Smith, *Diversity's Promise*, 48.

[99] Tanya Figueroa and Sylvia Hurtado, "Underrepresented Racial or Ethnic Minority (URM) Graduate Students in STEM Disciplines: A Critical Approach to Understanding Graduate School Experiences and Obstacles to Degree Progression" (St. Louis: Association for the Study of Higher Education, 2013), 2.

[100] Figueroa and Hurtado, "Underrepresented," 28.

[101] See MLA, "Report on the MLA Task Force on Doctoral Study in Modern Language and Literature" (https://www.mla.org/report_doctoral_study_2014); and MLA, "Data on Humanities Doctorate Recipients and Faculty Members by Race and Ethnicity" (http://www.mla.org/data_humanities).

[102] See http://www.asanet.org/press/20020607.cfm.

[103] See http://nsf.gov/crssprgm/advance/index.jsp.

[104] Lovitts, "Research on the Structure" in Paths, 133.

[105] *Paths to the Professoriate*, 111.

[106] Zuckerman, et al., *Educating Scholars*, 28.

[107] Damrosch, "Vectors of Change" in *Envisioning*, 41.

[108] Stacy, "Training Future Leaders," in *Envisioning*, 204.

[109] The report on the Mellon Initiative, *Educating Scholars,* provides an impressive array of kinds of data from which programs could choose, and though the initiative treated with the humanities, much of the research could be adapted with little change to the social and bench sciences. Further, several sources of national data regarding Ph.D. students are available on-line as resources that also might exemplify some key survey issues for individual programs. The NSF Survey of Earned Doctorates provides near-current (2013) overall and by general fields and specific disciplines, as well as demographic breakdowns by gender and by rac statistics e and ethnicity. Some of its tables also provide longitudinal data for considering trends. (http://www.nsf.gov/statistics/srvydoctorates/). The American Institute of Physics Statistical Research Center has been collecting data on undergraduate and graduate Physics and Astronomy

Students: https//www.aip.org/statistics/graduate. It is a rich resource especially for outcomes data—tracking 1400 graduates immediately after earning the Ph.D, one year later, and ten to fifteen years later. This last is available as https://www.aip.org/sites/default/files/statistics/phd-plus-10/PhysPrivSect.pdf. Another study, Recent Physics Doctorates: Skills Used and Satisfaction with Employment, compares the skills employed in their current posts by graduates from 2009 and 2010, with major contrasts between postdocs and students entering the private sector—https://www.aip.org/sites/default/files/statistics/employment/phs-skillsused-p10.pdf. These reports, taken together, not only provide a rich resource but a potential model for other disciplines to emulate.

Finally, though the data is not current, the Ph.Ds—Ten Years Later study led by Merisi Nerad when she was at Berkeley working with Dean Joseph Cerni, remains highly suggestive. Nearly 6000 graduates who received the doctorate from 1982 to 1985 from six deliberately varied disciplines—biochemistry, computer science and electrical engineering, English, mathematics, and political science—were surveyed. They comprised 57 percent of the total Ph.Ds awarded in those three years within the six disciplines, and the response rate was remarkable: 66 percent from domestic graduates, just over 50 percent from international graduates. The twenty-two page survey inquired about positions taken, the job-serach process, the factors influencing their career decisions, and a retrospective evaluation of the quality and usefulness of their graduate programs. A summary of results is available in the Paths to the Professoriate collection in the essay "So You Want to Become a Professor?" but the information gleaned is so rich for each of the disciplines; see

M. Nerad, R. Aanerud, and J. Cerny, "So You Want To Become a Professor!: Lessons from the Ph.D.s—Ten Years Later," in *Paths*, 137-58. Finally, the study by Barbara Lovitts, mentioned above, provides suggestive data on "Leaving the Ivory Tower," as her book is titled, though the relatively small number of students surveyed (819 in nine programs at only two universities) may not inspire full confidence on its own.

[110] See https://gradschool.duke.edu/about/program-statistics.

[111] Walker, *The Formation of Scholars*, 47-8.

[112] Nancy Borkowski, "Changing our Thinking about Assessment at the Graduate Level" in *The Assessment of Doctoral Education*, ed. Peggy L. Maki and Nancy A. Borkowsko (Sterling: Stylus, 2006), 11-52, 39.

[113] Damrosch*, Envisioning*, 42.

[114] Colleen Flaherty, "Fixing Humanities Grad Programs" *Inside Higher Education*, 7 December 2012. <https://www.insidehighered.com/news/2012/12/07/mla-president-says-reforming-graduate-education-humanities-requires-hard-decisions> Accessed Nov. 18, 2015.

[115] See Vimal Patel, "Health Care Is a New Flash Point for Graduate Students," *Chronicle of Higher Education*, October, 18, 2015. <http://chronicle.com/article/Health-Care-Is-a-New-Flash/233797> Accessed Nov. 19, 2015.

[116] The other forms of support, primarily fellowships and teaching assistantships, accounted for most of the other forms of support. Fellowships increased moderately to about 10,000, while support through teaching rose only slightly. See National Institutes of Health, "Biomedical Research Workforce Group Report: A Working Group of the Advisory Committee to the Director," (Bethesda: NIH, 2012), 7 <http://acd.od.nih.gov/biomedical_research_wgreport.pdf> Accessed Nov. 23, 2015.

[117] National Institutes of Health, "Biomedical Research Workforce Group Report," 36.

[118] Stacy, "Training Future Leaders" in *Envisioning*, 201.

[119] Zuckerman, et al., *Educating* Scholars, 5.

[120] Zuckerman, et al., *Educating* Scholars, 253.

[121] Zuckerman, et al., *Educating Scholars*, 131.

[122] Zuckerman, et al., *Educating Scholars*, 7.

[123] Zuckerman, et al., *Educating Scholars*, 153.

[124] Zuckerman, et al., *Educating Scholars*, 267.

[125] Prewitt, "Who," in *Envisioning*, 30.

[126] For more on professional development seminars, see Leonard Cassuto, "Changing the Way We Socialize Graduate Students" (*The Chronicle of Higher Education*, 10 January 2011. http://chronicle.com/article/Changing-the-Way-We-Socialize/125892/) and *The Graduate School Mess*, 124-125.

[127] Golde and Dore, *At Cross Purposes*.

[128] Lovitts, "Research on the Structure," in *Paths*, 133.

[129] F. H. Rhodes, "The New University" in W. Hirsch and L.Weber, eds*., Challenges Facing Higher Education at the Millennium* (American Council of Education Series on Higher Education, Onyx Press, 1999), 170.

[130] Weisbuch, "Toward a Responsive Ph.D*.,*" in *Paths*, 227.

[131] John Dewey, *The Political Writings*, ed. Debra Morris and Ian Shapiro (Indianapolis: Hackett, 1993), 8.

[132] The others are internationalism, interdisciplinary fields, collaborative learning, information technology, and wider access, all of which have implications for the Ph.D; see Douglas Bennett, "Innovation in the Liberal Arts and Sciences" in *Education and Democracy: Re-Imaging Liberal Learning in America,* ed. Robert Orrill (College Entrance Examination Board, 1997), 131-49, 1412.

[133] Andrew Delbanco, *College: What it Was, Is, and Should Be* (Princeton UP, 2012), 175-76.

[134] Jacques Berlinerblau, "Survival Strategy for Humanists: Engage, Engage" *Chronicle of Higher Education*, 5 August 2012 <http://chronicle.com/article/Survival-Strategy-for/133309/> Accessed Nov. 23, 2015.

[135] Walker, *The Formation of Scholars*, 79.

[136] For a description, see https:/fsp.trinity.duke.edu/.

[137] Cassuto, *The Graduate School Mess,* 234.

[138] Email correspondence with John Paul Christy, October 22, 2015.

[139] *The Responsive Ph.D.*, 55; see http://yoda.hnet.uci.edu/hot/.

[140] For more detail on the Boulder program, see https://www.insidehighered.com/news/2012/05/02/proposed-phd-german-colorado-aims-halve-time-degree

[141] *Paths*, 228-9.

[142] Kwiram, "Time for Reform?" in *Envisioning*, 146; *Envisioning*, 209.

[143] Menand, *Marketplace*, 153.

[144] Walker, *The Formation of Scholars*, 60.

[145] Ehrenberg, et al., *Educating*, 261.

[146] Ehrenberg, et al., *Educating*, 263.

[147] Kwiram, "Time for Reform?" in *Envisioning*, 146-47.

[148] Ehrenberg, et al., *Educating*, 155.

[149] *Paths*, 146. For more on Nerad and Cerny's *PhDs Ten Years Later* study, see https://depts.washington.edu/envision/resources/TenYearsLater.pdf

[150] *Envisioning,* 25.

[151] *Envisioning*, 125.

[152] Taylor, "Heeding the Voices" in *Envisioning,* 48.

[153] Nerad, et al., "Paths and Perceptions" in *The Assessment of Doctoral Education*, 134. To be sure, there is disagreement on this point. Marc Bousquet, for example, argues that a focus on anything but academic jobs would distract from necessary reforms of the academic workplace; see *How the University Works: Higher Education and the Low-Wage Nation* (New York: NYU Press, 2008).

[154] Anthony Grafton and Jim Grossman, "'No More Plan B': A Very Modest Proposal for Graduate Programs in History," *Perspectives on History*, October 2011 (http//www.historians-org/publications-and-directories/perspectives- on history/October 2011/no-more-plan-b).

[155] Walker, *The Formation of Scholars*, 91.

[156] Damrosch, "Vectors of Change" in *Envisioning*, 38.

[157] Bender, "Expanding the Domain of History," in *Envisioning*, 305.

[158] Stacy, "Training Future Leaders," in *Envisioning*, 197.

[159] http://www.hr.duke.edu/training/resources/mentoring/

[160] Stacy, "Training Future Leaders," in *Envisioning*, 200.

[161] http://gradschool.utk.edu/IDP.shtml

[162] http://www.grad-college.iastate.edu/current/professional_development/writing_seminars/files/IDP_Social_Sciences.pdf

[163] http://www.brown.edu/about/administration/biomed/graduate-postdoctoral-studies/sites/brown.edu.about.administration.biomed.graduate-postdoctoral-studies/files/uploads/OGPSIDPTemplate_1.docx

[164] http://gradschool.utk.edu/ogtm.shtml

[165] Walker, "The Questions in the Back of the Book," *Envisioning*, 348.

[166] Walker and Golde, *Formation of Scholars*, 120.

[167] See http://www.cmu.edu/teaching/simon/index.html and http://www.cmu.edu/teaching/.

[168] *Report to the President—Transformation and Opportunity: The Future of the U.S. Research Enterprise*, 2012

[169] Douglas Bennett, "Innovation in the Liberal Arts and Sciences" in *Education and* Democracy, 141-2.

[170] Golde and Dore, *At Cross Purposes*, 13.

[171] See Brown Graduate School, "Graduate School."

[172] *The Responsive Ph.D.*, 17.

[173] Walker, *The Formation of Scholars*, 41.

[174] For these and other examples, see Cassuto, *The Graduate School Mess*, 89-90; and the MLA Task Force Report.

[175] Walker, *The Formation of Scholars*, 54.

[176] Walker, *The Formation of Scholars*, 55.

[177] *Envisioning*, 66, 90.

[178] *Envisioning*, 197, 199.

[179] *Envisioning*, 53.

[180] For a full description see *The Responsive Ph.D.*, 45.
[181] http://cssc.berkeley.edu/programs/
[182] Candice Miller, "Case Study for Making the Implicit Explicit Research Project Conducted at the University of Colorado at Boulder: An Administrator's Experiences and Perspectives," in *Assessment*, 188-96, 193.
[183] Menand, *Marketplace,* 152.
[184] MLA, "Report on the MLA Task Force," 14.
[185] Hyman Bass, "Developing Scholars and Professionals" in Envisioning, 101-119, 109.
[186] "The Survey of Doctoral Education and Career Preparation," in *Paths*, 25.
[187] *Paths*, 89.
[188] See Gerald Graff, "MLA 2008 Presidential Address," http://www.mla.org/pres_address_2008.
[189] Hutchings and Clarke, "The Scholarship of Teaching and Learning," in *Paths*, 163.
[190] For more on Preparing Future Professors, see https://teachingcommons.stanford.edu/teaching-talk/preparing-future-professors.
[191] For more on Mellon's CUNY initiative, see Vimal Patel, "$3-Million Grant Puts Ph.D. Candidates in 2-Year College Classrooms." *Chronicle of Higher Education*, 1 November 2015. http://bit.ly/1Nf0rfi
[192] Ehrenberg, et al., *Educating*, 260.
[193] See Pat Hutchings and Susan E. Clarke, "The Scholarship of Teaching and Learning" in *Paths*, pp. 161-172.
[194] See http://www.teaglefoundation.org/Grantmaking/Grantees/default?rfp=391.
[195] http://illinoisstate.edu/catalog/pdf/gradSupplement2015.pdf
[196] http://catalog.missouri.edu/undergraduategraduate/interdisciplinaryacademicprograms/additionalminorsandcertificates/collegeteaching/
[197] http://depts.washington.edu/cidrweb/OLD/consulting/leadta.html
[198] http://www.maa.org/programs/faculty-and-departments/project-next
[199] See CITLR, "CIRTL Network Bibliography of Publications, Presentations, Posters, and Teaching-as-Research Projects," 2013 <http://www.cirtl.net/bibliography> Accessed Nov. 23, 2015.
[200] Derek Bok, *Higher Education in America* (Princeton: Princeton UP, 2013), 232, 240.
[201] Walker, et al., *Formation*, 5.
[202] Prewitt, "Who," in *Envisioning*, 23.
[203] *Paths to the Professoriate*, 88.
[204] Prewitt, "Who," in *Envisioning*, 23-24.
[205] Weisbuch, "Toward a Responsive," in *Paths*. 218.
[206] Walker et al., *Formation,* 3.
[207] Damrosch, "Vectors of Change" in *Envisioning*, 35.
[208] Woodrow Wilson National Fellowship Foundation, *Responsive*, 233.
[209] Tony Chan, "A Time for Change? The Mathematics Doctorate" in *Envisioning*, 120-134, 121.
[210] Damrosch, "Vectors of Change" in *Envisioning*, 34.
[211] Qtd. in Damrosch, "Vectors of Change" in *Envisioning,* 37-8